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Letter dated 30 June 2017 from the Secretary-General addressed to the President of the Security Council

I have the honour to transmit the attached communication, dated 29 June 2017, which I received from the Director General of the Organisation for the Prohibition of Chemical Weapons (OPCW) (see annex). The letter transmits the note by the OPCW Technical Secretariat on the report of the OPCW fact-finding mission in the Syrian Arab Republic regarding an alleged incident in Khan Shaykhun in April 2017.

I should be grateful if you would bring the present letter and its annex to the attention of the members of the Security Council.

(*Signed*) António **Guterres**

17-11206 (E) 070717

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Annex

[Original: Arabic, Chinese, English, French, Russian and Spanish]

I have the honour to transmit to you the note by the Technical Secretariat entitled "Report of the OPCW Fact-Finding Mission in Syria regarding an alleged incident in Khan Shaykhun, Syrian Arab Republic, April 2017" (see enclosure).

(*Signed*) Ahmet **Üzümcü**

Enclosure

[Original: Arabic, Chinese, English, French, Russian and Spanish]

NOTE BY THE TECHNICAL SECRETARIAT

REPORT OF THE OPCW FACT-FINDING MISSION IN SYRIA REGARDING AN ALLEGED INCIDENT IN KHAN SHAYKHUN, SYRIAN ARAB REPUBLIC APRIL 2017

1. On 4 April 2017 an incident was widely reported in the international press and social media alleging an attack involving the use of a chemical weapon in the Khan Shaykhun area of southern Idlib in the Syrian Arab Republic.

2. On 13 April at the Fifty-Fourth Meeting of the Executive Council, the Director-General informed the Council of the prompt action that had been undertaken by the OPCW Fact Finding Mission (FFM) in analysing all available information on the basis of which this was determined to be a credible allegation.

3. On 12 May 2017, the Secretariat issued a note S/1497/2017 providing an update to the States Parties on the activities of the FFM.

4. The FFM continued its work involving interviews, evidence management and sample acquisition.

5. The following is the report of the FFM regarding the alleged incident in Khan Shaykhun.

6. Based on its work, the FFM is able to conclude that a large number of people, some of whom died, were exposed to sarin or a sarin-like substance. The release that caused this exposure was most likely initiated at the site where there is now a crater in the road. It is the conclusion of the FFM that such a release can only be determined as the use of sarin, as a chemical weapon.

7. As regards the question of an on-site visit by the FFM to the scene of the incident, it is an area located outside the effective control of the Government of the Syrian Arab Republic. It is to be noted that the use of sarin or a sarin-like substance is not questioned. This is also evident from the position of the Government of the Syrian Arab Republic which provided to the FFM its own information and materials as evidence. Since the mandate of the FFM is confined to establishing only the fact of the use of chemical weapons, the security risks associated with a deployment to Khan Shaykhun far outweighed any additional corroboration of the facts that have already been established. The Director-General has therefore decided that the FFM will not undertake an on-site visit to Khan Shaykhun.

REPORT OF THE OPCW FACT-FINDING MISSION IN SYRIA REGARDING AN ALLEGED INCIDENT IN KHAN SHAYKHUN, SYRIAN ARAB REPUBLIC APRIL 2017

1. SUMMARY

1.1 The Fact-Finding Mission (hereinafter "FFM") conducted a preliminary assessment of all available information immediately after reports of the incident in Khan Shaykhun, which, at the time of the incident, was not under the control of the Government of the Syrian Arab Republic, surfaced in the media on 4 April 2017. The nature and extent of the information available provided a credible basis for investigation, which resulted in the FFM being mandated to gather facts regarding this incident of alleged use of toxic chemicals as a weapon.

1.2 The FFM was led by and predominantly comprised of inspectors from the Technical Secretariat (hereinafter "the Secretariat"), and was supported by various other divisions and branches within the Secretariat. Interpreters were embedded in the team and were critical to the effective functioning of the mission.

1.3 With support as indicated above, the FFM made preparations to deploy. An advanced team departed within 24 hours of being alerted to the incident, with the main team departing 24 hours later to a neighbouring country, where casualties had been transported.

1.4 The conclusions were derived from analysis of biomedical specimens, interviews, and supplementary material submitted during the interview process. Additional data came from analysis of environmental samples. Evidence was cross-referenced and subsequently corroborated.

1.5 Whilst unable to visit the location shortly after the incident, the rapid deployment enabled the team to attend autopsies, collect biomedical specimens from casualties and fatalities, interview a wide variety of witnesses, and receive environmental samples.

1.6 The team received limited information on the dispersal mechanism and, therefore, was unable to make firm conclusions on that specific matter. However, the biomedical specimens, of which the FFM had full custody, provided incontrovertible evidence that people were exposed to sarin or a sarin-like substance.

1.7 The team concluded that a large number of people, some of whom died, were exposed to sarin. The release that caused exposure was likely to have been initiated in the crater in the road, located close to the silos in the northern part of the town. The team concluded that, based on such a release, the only determination that could be made was that sarin had been used as a weapon.

2. LEGAL FRAMEWORK

2.1 The FFM was set up "to establish facts surrounding allegations of the use of toxic chemicals, reportedly chlorine, for hostile purposes in the Syrian Arab Republic" on the basis of the Director-General's authority under the Chemical Weapons Convention (hereinafter "Convention") to seek to uphold at all times the object and purpose of the Convention, as reinforced by the relevant decisions of the OPCW Executive Council and the United Nations Security Council resolution 2118 (2013).

2.2 The Terms of Reference of the FFM were mutually agreed upon by the OPCW and the Syrian Arab Republic through the exchange of letters between the OPCW Director-General and the Government of the Syrian Arab Republic, dated 1 and 10 May 2014, respectively (Annex to the Note by the Technical Secretariat S/1255/2015, dated 10 March 2015).

2.3 The continuation of the FFM was subsequently endorsed by the Executive Council (hereinafter "Council") in decision EC-M-48/DEC.1, dated 4 February 2015, as recalled by United Nations Security Council resolution 2209 (2015), and subsequently decision EC-M-50/DEC.1, dated 23 November 2015. Both of these Council decisions and resolution 2209 (2015) require the FFM to study all available information relating to allegations of the use of chemical weapons in Syria, including that provided by the Syrian Arab Republic as well as by others.

2.4 The OPCW FFM is also referred to in the United Nations Security Council resolution 2235 (2015) establishing the OPCW-UN Joint Investigative Mechanism (hereinafter "JIM") and the United Nations Security Council resolution 2319 (2016) extending the mandate of the JIM by one more year.

2.5 The scope of the Fact-Finding Mission's mandate does not include the task of attributing responsibility for the alleged use[1].

[1] Fifth preambular paragraph of EC-M-48/DEC.1; sixth preambular paragraph of EC-M-50/DEC.1; eighth preambular paragraph of the United Nations Security Council resolution 2235 (2015).

3. METHODOLOGY

Methodological considerations

3.1 The three principles serving as the foundation in developing the team's methodology were:

(a) ensuring a validated methodology for the acquisition and analysis of evidence to the fullest extent possible under mission conditions;

(b) ensuring that the personnel conducting the investigation have the appropriate skill set and experience; and

(c) ensuring the implementation of appropriate chain of custody procedures for evidence collection.

3.2 Access to physical evidence, electronic evidence, witnesses, and documentation, in addition to the time lag between the allegation and access, differs from allegation to allegation. The FFM applied the same overarching methodology to all allegations, whilst recognising that the differing circumstances of each allegation assign lesser or greater relevance to the various components of the detailed methodology.

3.3 Accordingly, the FFM reviewed and compared the methodology in S/1318/2015 (including Rev.1 and Rev.1/Add.1), S/1319/2015, S/1320/2015, S/1444/2016, and S/1491/2017 to ensure consistent application of investigative methodology with respect to previous allegations.

3.4 Similarly, subsequent conclusions and detailed methodology related to this allegation were compared to previous allegations (referenced in paragraph 3.3 above) to ensure that report outputs are consistent.

METHODOLOGY FOR THE ACQUISITION AND ANALYSIS OF EVIDENCE

3.5 Throughout its work, the OPCW Fact-Finding Mission in Syria complied with the current OPCW guidelines and procedures for the conduct of an investigation of alleged use (hereinafter "IAU") of chemical weapons (Annex 1).

3.6 The FFM also adhered to the most stringent protocols available, using both objective criteria and standard questionnaires for such an investigation, as included in procedures listed in Annex 1. As these questionnaires were specifically designed for IAUs, slight adaptations were occasionally required. The authority permitting such flexibility to make adaptations is expressly provided for in the OPCW procedures. Additionally, any adaptations were minor and were carried out in consultation with the Office of the Legal Adviser and the Office of the Director-General.

3.7 The prioritisation of evidence was based on relevance in accordance with the guidance provided in the OPCW procedures, and re-evaluated according to the degree of separation in the chain of custody between the source and receipt by the team. Types of

evidence were then defined as primary, secondary, or tertiary, in descending order of value.

3.8 Principal methods for collecting and evaluating the credibility of information included, inter alia, the following: research into incidents and existing reports; assessment and corroboration of background information; conduct of interviews with relevant medical care providers, with alleged casualties, and other individuals linked to the reported incident; review of documentation and records provided by interviewees; assessment of the symptoms of victims as reported by interviewees; and collection of biomedical specimens and environmental samples for subsequent analysis.

3.9 As mentioned above, in accordance with the OPCW procedures, as applicable, the FFM categorised evidence as primary, secondary and tertiary. The ascribed values took into consideration corroboration between interviewee testimonies, open-source research, documents and other records, and the characteristics of the samples provided. No metadata forensic analysis was carried out on the electronic records provided by the witnesses.

3.10 During the short preparatory phase, the team engaged in open-source research concerning the allegations (Annex 2). The majority of sources included news media, blogs, and the websites of various non-governmental organisations (NGOs). The team managed contact with the casualties and other interviewees through various NGOs and States Parties.

Access to relevant geographic locations

3.11 During an investigation, complete, direct, and immediate access to the alleged initiation site provides the greatest opportunity to collect high value evidence. Considering various constraints, such as available time and security concerns, the FFM based its decisions on whether or not to conduct on-site visits, including interviews, on four main factors:

(a) scientific and probative value of an on-site visit;

(b) a risk assessment of conducting visits in the midst of ongoing armed conflict;

(c) determination of whether casualties and/or witnesses had been able to cross the national borders for treatment and were willing to meet the FFM team; and

(d) determination of whether permission to visit the site, including the issuance of visas, could have been granted in time to allow immediate access.

3.12 Ideally, potential interviewees would be identified by one of two means: the first through identifying witnesses at the alleged impact site by the investigation team, and the second through the identification of potential interviewees as possible leads by other sources deemed to be reliable by virtue of proximity.

3.13 Owing to such factors as security concerns in the region of the alleged incident, the time frame of events—whereby no permission was in place when the team initially deployed,

which would have provided the best circumstances for evidence retrieval—and some casualties and other witnesses had been transferred to a neighbouring State Party, it was determined that the risk of a visit to the incident area would be prohibitive for the team. Therefore, the team could not visit the site shortly after the allegation to observe, assess, or record the location of the alleged incident, could not canvass directly for other witnesses, and could not collect environmental samples and/or remnants of the alleged munitions.

3.14 Furthermore, the scientific and probative value of visiting the site diminishes over time, particularly if it is not possible to manage access to the site. Hence, the evidentiary value of samples taken close to the time of the allegation, supported by photographic and video evidence and in association with witness testimony, needs to be balanced against the evidentiary value of the FFM visiting the site some time later to collect its own samples.

3.15 However, the presence of casualties for treatment in a neighbouring country provided potential for interviews, the collection of biomedical samples, and access to medical records.

Attendance at Autopsies

3.16 Whilst the advanced team was en route to a neighbouring country, the FFM was informed that autopsies were to be carried out on three alleged victims. Attendance at autopsies provided potential for collection of biomedical specimens, access to autopsy records, and identification of the cause(s) of death.

Selection of interviewees

3.17 Through liaison with representatives of several NGOs, including Same Justice/Chemical Violations Documentation Centre Syria (CVDCS), the Syrian Civil Defence (also known as White Helmets, and hereinafter "SCD"), the Syrian American Medical Society (SAMS), and the Syrian Institute for Justice (SIJ), the FFM identified a number of witnesses to be interviewed. These witnesses were expected to provide testimony and potentially relevant evidence.

3.18 The FFM sought a variety of witnesses of different age ranges to cover various aspects, including: the site of the alleged incident; the location, rescue, condition, transport, and treatment of casualties; and the acquisition of samples.

3.19 Liaison continued with the NGOs and official representatives of a neighbouring State Party. The ultimate purpose of the liaison was to coordinate logistics and movements, identify casualties and witnesses—including their location—and arrange for relevant authorisations. These discussions were initiated shortly after the team became aware of the allegation and continued throughout the process.

3.20 Furthermore, two people were presented as interviewees by the Government of the Syrian Arab Republic.

3.21 Potential interviewees were in several locations, either in Syria, or in hospitals in a neighbouring country, or elsewhere in a neighbouring country. Different logistical requirements and authorisations were required, depending on their location and depending on whether taking biomedical specimens was also feasible.

Interview process: overview

3.22 The FFM made every effort to respect cultural and religious values and norms, national customs, and the personal pressures and traumas associated with exposure to toxic chemical(s), in addition to the health condition of casualties.

3.23 In conducting the interviews, full consideration was given to the privacy and protection of participants. All information was kept confidential, and the identities of casualties and witnesses were protected at all times. An identity number was assigned to each interviewee and only this number was used to process data. The master list with the names of the witnesses was kept secure by the FFM.

3.24 Interview methods were based on the free recall technique, tailored with follow-up questions relevant to this investigation and adapted from standard operating procedures (QDOC/INS/WI/IAU05).

3.25 With the exception of one interview that was held in English without interpretation, all interviews were held in English with Arabic interpretation.

3.26 To the extent possible, given the circumstances of the individual interview and interviewee, each interviewee was given an overview of the interview process. A consent form for each interview was prepared using the personal details of the interviewees and their identification papers. This was followed by the signing of the consent form. Many interviewees expressed concern that their personal details, coupled with the information they were providing, would be disseminated outside of the OPCW without their knowledge, and concerns about the potential impact that would have on their security. All interviewees were assured that they would remain anonymous.

Interview process: hospitals

3.27 Facilities that provide medical treatment have, for reporting purposes, been generically referred to as medical facilities. These include established major hospitals, smaller specialist hospitals, field hospitals, and basic medical centres that offer little more than first aid.

3.28 Due to concerns raised by some of the witnesses, medical facilities—aside from those mentioned specifically herein—are not individually identified in this report. For ease of reporting, they have been given individual codes.

3.29 Those codes were used by the team during the mission. However, not all hospitals are included in the reporting phase, therefore the codes are not necessarily sequential in section 5 of this report.

3.30 To the extent feasible, witnesses were given an explanation of the team's mandate, background and process, including, among other things, confidentiality aspects and consent.

3.31 The team did not perform any interviews in public areas and was unable to perform interviews with those who were unconscious or barely conscious. As such, only one interview was possible, at the time, with hospital-based casualties. That particular interview continued for as long as permitted by the patient's condition at the time of the interview.

3.32 Given that only one interview was possible at the time, the team selected two of those patients and interviewed them after they were discharged and after the results of the biomedical specimens were known. The delayed interviews enabled a more thorough interview than had been possible in the hospital and ensured that interviews were performed with those who had tested positive for exposure.

3.33 The team conducted an interview with a treating physician at a hospital who received patients involved in this allegation in Syria. This was carried out in private at the hospital.

3.34 The team obtained consent for both interviews (with one doctor and one patient) that were carried out at hospitals.

Interview process: elsewhere

3.35 For other witnesses who could be interviewed at locations other than hospitals, including witnesses interviewed after their discharge from hospital, a suitable location (city and precise location within the city) for the safe, accessible, and comfortable conduct of interviews was chosen.

3.36 Most interviewees were transported in small groups, either with the support of NGOs or a State Party, to the city where the interviews were to be conducted. Interviewees were individually transported to the precise interview location, where they were met by the interview team.

3.37 At the beginning of individual interviews, each interviewee was given an overview of the team's mandate, background and process, confidentiality aspects and consent. Once the process was mutually agreed between the interview team and each interviewee, the recording devices were switched on. Both audio-visual and audio-only recording were used. Consent forms were signed after switching on the recording devices.

3.38 The initial portion of the recorded interview followed a standard procedure of an introduction of everyone present in the room, an explanation of the aims of the interview, and confirmation of consent. Subsequently, the interviewees delivered their statements on the incident(s). With a view to obtaining a full account of what was witnessed and experienced by the interviewees, follow-up questions were posed by the interview team, including a review of regional maps for identification of key locations, when possible. All review processes that used a computer were recorded on video

and/or audio. Furthermore, any additional evidence provided by the interviewees was reviewed, including, but not limited to documents, photographs, and videos. The testimonies and evidence were secured.

3.39 When circumstances dictated the need to do so, the FFM formed two interview teams that conducted concurrent interviews in two separate rooms. Each interview team set out to elicit maximum information from a range of perspectives. In order to do so, interview teams were comprised of cross-functional skill sets.

3.40 After every interview, the FFM held a debriefing session where the findings were shared within the team. All data and documents collected were secured at the end of each day.

Epidemiological methodology

3.41 Epidemiological determination of cause and effect was established according to the following criteria:

(a) there must be a biologically plausible link between exposure and outcome;

(b) there must be a temporal relationship between exposure and outcome; and

(c) there must not be any likely alternative explanation for the symptoms.

3.42 An epidemiological investigation includes: a review of all the documentation related to an alleged incident; an epidemiological description of the incident; interviews with presenting witnesses, health-care workers, and first responders; first-hand interviews with survivors; and on-site assessments of symptoms and signs, including assessments of the clinical severity of their syndromes. Further information regarding the treatment and outcomes of persons exposed should be retrieved from medical files relating to the time of incident and from interviews with the treating clinicians. The epidemiological investigation should yield information about the scale of each event and provide contextual and geographical information that should subsequently be cross-checked and corroborated by the environmental sampling teams.

3.43 However, as mentioned previously, the FFM was not able to physically visit the locations of the alleged incident, and, therefore, did not have the opportunity to:

(a) assess the geography of the location of the alleged incident;

(b) visit the hospitals and clinics where the casualties were initially treated;

(c) gain direct access to records, including patient registers, medical files, treatment records, radiographs, laboratory reports, from those previous treatment facilities; and

(d) conduct on-site collection of testimonies and clinical examination.

3.44 The FFM could nevertheless rely on clinical examinations at the hospitals in which the casualties were located at the time of the team's deployment, and had direct access to records that were brought to interview by witnesses.

3.45 The epidemiological investigation was therefore focused on collecting testimonies from casualties and from those providing medical care at that time, together with collecting and examining any relevant documentary evidence that they might offer.

Sampling and analytical procedures for environmental samples

3.46 Typically, samples from an incident would be collected by the investigating team immediately after the incident, using approved procedures and equipment, including full documentation of the chain of custody of the samples. As noted earlier, the team was constrained due to the inability to access the site of the alleged incident and the amount of time that had passed between the alleged incident and receipt of samples by the team (depending on the source, between 1 week and 2 months after the incident). As a result, the team was unable to:

(a) assess the geography and conditions of the location of the alleged incident;

(b) directly select sampling points and items;

(c) conduct on-site collection of samples; and

(d) implement a complete chain of custody, by the team, for samples from source.

3.47 In the absence of direct sampling at the location by the team, the FFM requested that any samples and sampling procedures provided by other parties be supported as much as possible by photographs, video footage, and witness testimony.

3.48 The samples were transported to the OPCW Laboratory, where most were split by laboratory personnel and sent to two designated laboratories for analysis. A few of the samples were difficult to split and were, therefore, sent only to one of the two designated laboratories.

3.49 Given the unknown nature of other possible innumerable toxic chemicals (such as volatility, vapour density, prevalence of naturally occurring markers, or degradation products and rates), any selection of samples from those offered to the team and the subsequent analyses of such samples required careful consideration. With such a broad range of unknowns, the team considered and accepted a broad array of sample types, with the intention of subjecting them to an equally broad array of analyses.

3.50 The FFM used OPCW designated laboratories for the analysis of the samples received. Designated laboratories (DLs) carry out the analysis of authentic off-site samples in accordance with the relevant decisions taken by the States Parties to the Chemical Weapons Convention (hereinafter "the Convention").

3.51 The exception to this was in relation to samples provided by the Government of the Syrian Arab Republic. Prior to handover to the FFM, those samples were analysed by

the Scientific Studies and Research Centre (SSRC) in Barzah. The FFM was also provided with an analytical report compiled by the SSRC in Barzah. Subsequently, those samples were also analysed by the OPCW Laboratory prior to being sent to OPCW DLs.

Biomedical specimens

3.52 Specimens from autopsies carried out in a neighbouring country were taken by forensic laboratory staff with their equipment in the presence of the FFM team and remained in the FFM's custody until transfer to the OPCW Laboratory personnel. The specimens were handled in accordance with recommendations from the OPCW Laboratory for storage of such specimens. Those storage conditions were also applied during transport. No further manipulation or procedures were carried out on the specimens by the team and they were transferred to the OPCW Laboratory.

3.53 Specimens taken from patients in a neighbouring country were taken using equipment and vials provided by the FFM team. Blood samples were taken from ten patients and urine samples taken from five of those ten.

3.54 Specimens were also received from doctors who treated patients inside Syria and collected biomedical samples. Those samples included blood, urine, hair, and secretions.

3.55 Specimens were received from Idlib Health Directorate (as part of the medical system in place in Idlib, not controlled by the government). Those specimens included blood, urine, and hair.

3.56 Blood was separated in-country into plasma and cells, and then divided into separate aliquots from each individual, depending on the quantity of blood provided. All biomedical specimens were transported to the OPCW Laboratory. The urine and blood samples were repackaged and transported to two laboratories designated for the analysis of authentic biomedical samples (S/1402/2016).

Analysis of initiation event

3.57 As with other evidence, visits to the site of an alleged incident and collection of evidence at the site would have provided the most valuable input, particularly if the collection could have been done very close to the time of the alleged incident.

3.58 Further means of validation would ideally be provided by comparing observations from interviewees against the expected behaviour of a known device or theoretical design. Given the uncertainty around the volume of the chemical and how it might behave under unknown energetic and mechanical dispersion conditions, it would not be possible to compare the theoretical dispersion of chemicals and fragments to that described by interviewees and shown in photographs and videos.

3.59 Exploitation of the site by other parties also adversely impacted the FFM's ability to receive a broader range of evidence from the site and build a picture of the alleged method of dispersion.

PERSONNEL SELECTION, SKILL SETS, AND TRAINING

3.60 Team members were selected based on their specific skill sets across a broad range of mission requirements. The skill sets included knowledge and expertise in the following fields:

(a) analytical chemistry;

(b) biomedical analysis;

(c) medical/health, including epidemiology and first response;

(d) organic chemistry, including chemistry of scheduled chemicals;

(e) interview and negotiation;

(f) toxic chemicals;

(g) munitions and delivery systems; and

(h) non-routine mission experience, including previous experience with fact-finding missions and other missions to the Syrian Arab Republic.

3.61 Equipment needs were identified and equipment was sourced while movements and logistics were arranged. Expert advice and consultation was also coordinated with resources from the Secretariat, particularly with regard to health and safety, security matters, and the legal aspects of the process.

3.62 The above preparations ensured that sample receipt, interviews, and all other evidence collection were performed by fully trained and qualified inspectors.

CHAIN OF CUSTODY, EVIDENCE COLLECTION AND HANDLING

3.63 The FFM collected evidence in the form of witness interviews and statements (taken as audio and/or video recordings) and documents, photos, and/or videos handed over by witnesses. The team additionally received environmental and biomedical specimens collected by witnesses, first responders, medical staff, and/or other individuals linked to the reported incident.

3.64 The FFM witnessed the collection of all biomedical specimens taken in the neighbouring country and took immediate custody. Generally, unless otherwise specified, samples included biological and/or biomedical specimens.

3.65 The following procedures aimed at ensuring the chain of custody from the moment of receipt were applied during the mission:

(a) All witness statements and interviews were video and/or audio recorded and the recordings were documented as evidence.

(b) All electronic files or paper documents handed over by interviewees were registered in the evidence logbook.

(c) In order not to alter the metadata of the files, electronic data storage devices were viewed either directly or via a universal serial bus (USB) bridge, and secure digital ultra-small flash memory cards were locked prior to viewing.

(d) Files on original electronic storage devices were copied to provide best evidence, and working copies were made so as not to compromise original information during data handling.

(e) The receipt, packaging, and sealing of the samples provided were supported by photographs and appropriate paper documentation.

(f) The received samples were in the possession of at least one team member and under OPCW seal from the time of receipt until arrival at the FFM on-site office.

(g) At the FFM on-site office, samples were fully documented, packaged and sealed so that the packaging was appropriate for safe transport.

(h) The integrity of the samples was ensured through their physical possession by an FFM member and/or through tamper-proof seals.

(i) All seals and accompanying documentation were confirmed as correct and intact prior to the issuance of handover and takeover receipts.

3.66 Most of the samples delivered to the FFM were supported by witness testimony and accompanied by documents, including photographs and video. Although the documentation and testimony, in most cases, provided a good degree of confidence in the chain of custody prior to receipt by the FFM, the entire chain of custody could not be categorically verified. Such samples included biomedical samples that were not collected in the presence of team members, environmental samples, and dead creatures (referred to biological-environmental samples).

3.67 The FFM followed procedures to ensure a strict chain of custody from the time of receipt through delivery to the OPCW Laboratory in Rijswijk, the Netherlands, by the procedures described above. Additionally, similar stringent measures were applied when transferring the samples to selected DLs, where activities were conducted using standardised procedures (including quality assurance and quality control checks) for receiving, storing, preparing, and analysing samples. The results were then communicated to the FFM team for review. Each transfer of material was accompanied by documentation of the transfer.

4. DEPLOYMENT DETAILS AND CHRONOLOGY

4.1 The table in Annex 3 indicates the significant timelines for the deployment of the FFM, interview of witnesses, and collection of samples.

Initiation

4.2 Immediately after reports of the incident in Khan Shaykhun surfaced in the media on 4 April 2017, the FFM commenced collection and review of all relevant information. Those reports, including posts on social media, presented a situation of a potentially large number of casualties resulting from possible exposure to a toxic substance.

4.3 A preliminary assessment was undertaken and, in view of the gravity of the reports, the Director-General of the Secretariat of the OPCW instructed that all FFM resources be mobilised to analyse the incident. Given that the nature and extent of the information available qualified the incident as a credible account of a possible use of a toxic chemical, an initial FFM team was able to deploy in less than 24 hours.

4.4 Active monitoring of the media by the Information Cell and by the FFM continued. That allowed the FFM to map the site of the reported incident and to identify potential interviewees and possible evidence. Through reports and information from States Parties, the Secretariat was made aware of a number of casualties having been taken, or having made their way, to a neighbouring country.

Deployment activities

4.5 As the FFM was already engaged in analysing a number of recently reported incidents on the alleged use of chemicals as weapons, it had access to lines of communication with parties who had knowledge of and connections to the area in question. Those contacts were used to identify quickly the initial casualties from this incident.

4.6 Furthermore, the team deployed with the equipment necessary to cover all aspects of the mission, including an environmental sample collection kit, a biomedical specimen collection and transport kit, communications equipment, interview equipment, and personal protective equipment (PPE), including PPE for handling toxic material.

4.7 Rapid mobilisation was crucial in the first instance in allowing FFM team members to attend the autopsies of three victims on Wednesday, 5 April 2017, and to witness the extraction of biomedical specimens from the bodies. The team requested autopsy records to verify the cause of death. The Secretariat received the autopsy reports in the original language on 12 May 2017.

4.8 On Saturday 8 April 2017, the FFM team visited three hospitals, whilst there was still a high potential to interview patients and collect relevant biomedical specimens and associated testimony.

4.9 Despite this rapid deployment, many patients had been discharged from medical facilities before the FFM was able to meet them. However, the team was still able to witness the collection of biomedical specimens from ten casualties (blood samples from

10, and urine samples from five), and was able to meet with casualties from the alleged incident. At the time of the visit to the hospitals, the team interviewed one of those casualties and one treating physician. The blood from seven of the 10 patients tested positive for exposure. The team selected two further patients from those seven, located them, and interviewed them on 31 May and 1 June 2017.

4.10 Biological-environmental specimens (two dead birds and hair from a dead goat) were received by the FFM team on 12 and 13 April 2017. The FFM had been advised that those animals had been close to the incident site. Anatomical parts and internal organs were removed from the birds and taken by the team.

4.11 Environmental samples, such as clothing, soil from the crater of the suspected impact point, and soil from locations close to the suspected impact point were received by the team on 13 April 2017.

4.12 In addition to the biomedical specimens, collected in the presence of the FFM, further biomedical specimens were collected at medical facilities in Syria by medical personnel operating in the opposition-controlled area. Those specimens were passed to the FFM team on 12 and 14 April 2017.

4.13 At the time of handover, the team was informed that all samples were taken by NGOs. That information was corroborated by the testimony from other witnesses interviewed by the FFM. A representative of an NGO was also interviewed and provided photographs and videos from the site of the alleged incident.

4.14 Amongst the casualties were four first responders reported as showing signs of exposure. The FFM interviewed one of them and witnessed the collection of a blood sample by a nurse.

4.15 The team deployed twice to Damascus to collect information from the Government of the Syrian Arab Republic, perform interviews, collect physical evidence, and explore possibilities for a potential visit to Khan Shaykhun.

4.16 The FFM visited the SSRC in Barzah on 18 June 2017 and received additional environmental samples and metal fragments.

4.17 As at Thursday, 22 June 2017, the FFM had interviewed 34 witnesses (29 male, five female), received 415 photos, six audio files and 178 videos during interviews, in addition to 30 environmental samples, 48 biomedical samples, 699 pages of records (including autopsies, medical records, death certificates and other patient information), 10 parts from three biological-environmental specimens, 12 electronic documents (including MS Word, MS Excel, PDF, and txt formats) and two CDs containing videos.

5. INCIDENT SUMMARY AND ANALYSIS

5.1 Khan Shaykhun is a town in the sub-district of the Maarrat al-Nu'man District, within the Idlib Governorate of the Syrian Arab Republic. It is located approximately 35 km north of Hama City and 60 km south of Idlib City.

5.2 Prior to the conflict (based on figures from the 2004 census), the population of the town and the surrounding district was approximately 50,000 people.

5.3 In April 2017, at the time of the allegation, the town was not under government control.

5.4 Between 8 April and 22 June 2017, inclusive, the FFM interviewed 34 people in person, including patients, doctors, nurses, first responders, and other witnesses.

Topography and weather

5.5 The following figures show the area of Khan Shaykhun and the area related to the allegation.

FIGURE 1: RELATIVE LOCATION OF KHAN SHAYKHUN IN NORTH WESTERN SYRIA

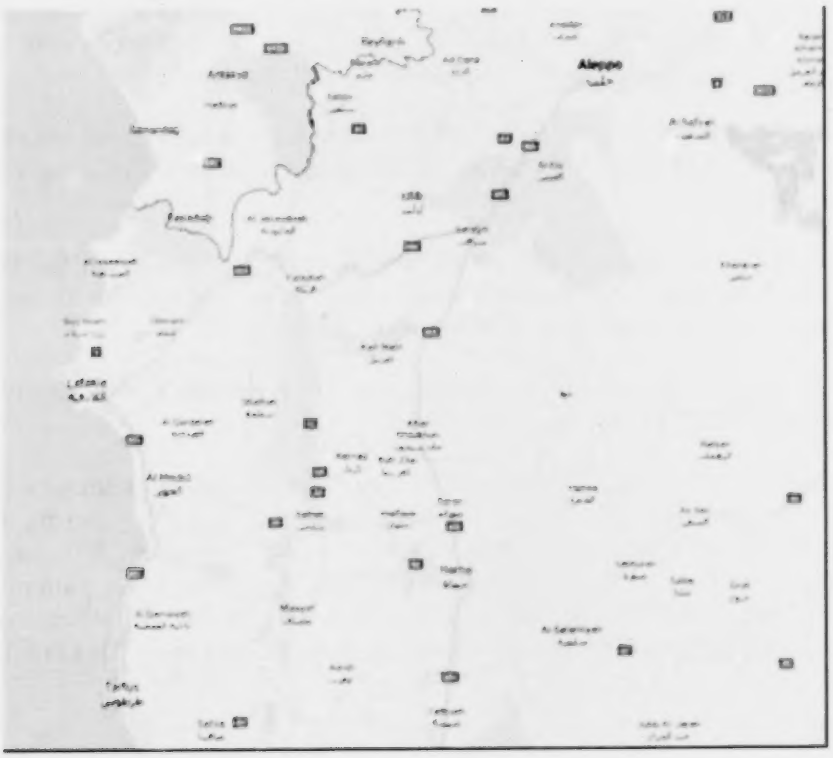
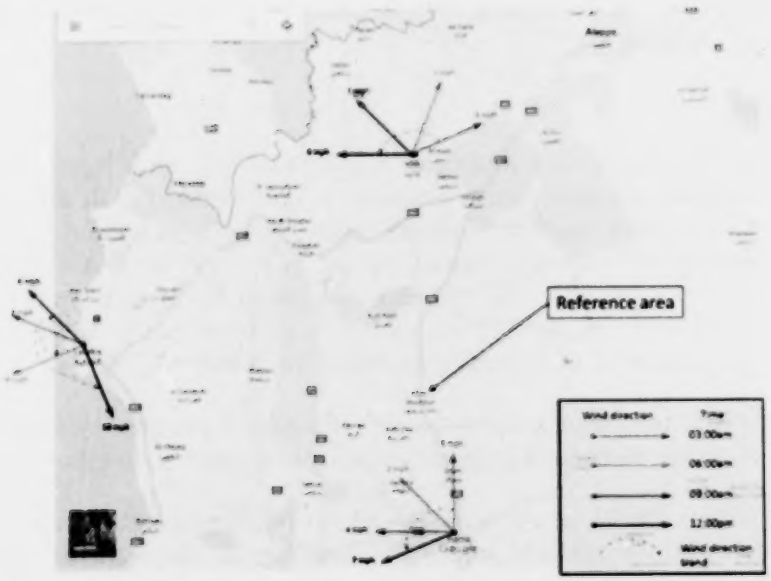


FIGURE 2: KHAN SHAYKHUN

5.6 No meteorological data was available for Khan Shaykhun, therefore weather conditions were estimated by reviewing historical data from www.worldweatheronline.com and www.wunderground.com in Hama City, Idlib City and Latakia. The following figure shows the wind directions over time in these three locations on the morning of 4 April 2017.

FIGURE 3: VARIATION OF WIND DIRECTION AND WINDSPEED ON 4 APRIL 2017



5.7 Based on that data, the wind speed was low but with no certainty of wind direction. The team estimated the likelihood that the wind was coming from somewhere between the South and the East, but could not be certain.

5.8 The following figure depicts the topography in and around Khan Shaykhun. It was designed with Global Mapper (Geographic Information System software) and provides a three dimensional indication of the terrain features in the area. The blue boxed area marks the Khan Shaykhun bakery, for reference.

FIGURE 4: THREE-DIMENSIONAL DEPICTION OF THE TOPOGRAPHY IN AND AROUND KHAN SHAYKHUN

5.9 The narratives in the following section include witness testimony in relation to the weather and topography.

Narrative

5.10 The narrative in this section relates to Khan Shaykhun on 4 April 2017. It is derived solely from interviews and, where possible, is corroborated with different interviewees. As such, the narrative has been formed neither from information in open sources, nor from information that may have been supplied by States Party. A different narrative was given by witnesses identified by the Government of the Syrian Arab Republic. Due to the inability to interview more of such witnesses, it was not possible to corroborate this narrative. The narrative is, however, included for completeness.

5.11 At the time of the allegation, the town comprised people, including families, who originated from the town, and internally displaced people from other parts of Syria.

5.12 At approximately 06:30, alerts were issued via hand-held radios reporting that military jets had departed an airfield and were heading in the general direction of Khan Shaykhun, amongst other areas. At that time, many residents were at home, either in

bed or preparing to go to work. The weather was sunny, with a clear sky and no discernible wind.

5.13 A broad description of the topography showed a small downward incline to the south and west from the initiation point.

5.14 Shortly afterwards, there was a swooping sound, as made by a jet when it attacks, but without a subsequent loud explosive sound.

5.15 One witness went on to his balcony after hearing the noise of the jet and observed a boy (approximately 12 years old) in the road, coming from the direction of the bakery and grain silos. The witness recognised the boy as someone who regularly sells fuel from the roadside near the bakery. He saw the boy fall down and left his house to help the boy. Whilst providing assistance to the boy, the witness was warned of an attack by a jet, via a radio, and took cover.

5.16 That attack resulted in several explosions in a residential area to the west of grain silos in the northern part of Khan Shaykhun.

5.17 Upon hearing the explosion(s), other residents left their homes to help neighbours who may have been injured in the attack.

5.18 Upon arrival at the site, first responders belonging to the SCD found, in addition to a small number of casualties exhibiting trauma type injuries, many civilians who appeared to have no external injuries. The symptoms of those exhibiting no external injuries, as described at that stage by non-medical personnel, included "people who were walking and then fell down", suffocation, and muscle spasms.

5.19 Members of the SCD and other civilians attempted to rescue casualties and transport them to the medical centre in Khan Shaykhun, (coded as MF-F) either by ambulance or by private vehicle.

5.20 An ambulance departed the site driven by a first responder. Five casualties were also in the ambulance, one of whom was another first responder. The driver had reported feeling drowsy shortly after departing the site. The ambulance, with casualties still inside, was found approximately two hours later, close to the site. The ambulance driver and the other first responder, who was in the ambulance, regained consciousness later in Medical Facility D (MF-D) having been rescued themselves.

5.21 A number of casualties were initially transferred to MF-F. The local headquarters of the SCD were also located in the vicinity of the medical centre. Once it became apparent to the staff of the hospital and to the SCD that they were dealing with a potential chemical incident, patients were washed with water by the fire crew of the SCD upon arrival.

5.22 Given the limited health care capability at MF-F, patients were transferred to several different medical facilities in the region, either passing through MF-F or going directly to other facilities. Admittance to medical facilities and possible subsequent transfer were made on the basis of whether the receiving or potential receiving medical facilities had the capacity and capability to deal with such casualties.

5.23 Initially, no patients were transferred to Al Ma'arra National Hospital, which was the main hospital in the region, as it was taken out of service a few days earlier. It is unclear whether or not this facility opened later in the day on a limited basis to support the treatment of casualties.

5.24 Several patients, particularly those needing a higher level of care according to the assessment of Syrian doctors, were further transferred to a neighbouring country for treatment in medical facilities there.

5.25 Interviewees reported cases of exposure due to cross contamination, such that 10 members of the SCD presented mild to moderate symptoms and about five medical staff from medical facilities presented similar symptoms.

5.26 Several interviewees reported their relocation away from Khan Shaykhun following the allegation.

Interviews conducted in Damascus

5.27 The narrative collected from two interviews conducted in Damascus over the period of 21 – 22 June 2017 differs. One interviewee stated that "members of" ... an armed opposition group... "had evicted tenants from a house in Khan Shaykhun, replacing them with new tenants and the house was used for the storage of weapons, munitions and barrels some two months prior to the incident on 4 April 2017". That house appeared to have been damaged at some time during the incident on 4 April 2017.

5.28 The other interviewee recalled that at around 07:00 on 4 April 2017, he was woken by the sound of an explosion and observed a cloud above a building which he described as a "chemical warehouse". Approaching the location of the cloud he felt dizzy, and feeling unwell, he went back to his house to rest while his condition improved. Two to three hours later, on hearing ambulance sirens, he left his house to witness casualties being decontaminated and treated by first responders wearing respiratory protection. He recalled that the roads were blocked and only ambulances "from a neighbouring country" and water tankers were allowed inside the affected area. The casualties, some of whom appeared unresponsive with shallow breathing, were transported to Al Rahma field hospital in Khan Shaykhun.

5.29 Both interviewees informed the interview team that there was an established early warning system that used hand-held radios to pass warning messages in case of aircraft overflights so that townspeople could take cover. However, on the morning of the incident they reported that no such warnings were received until around 11:00 to 11:30 and no aircraft were observed until that time

Impact points and location of casualties

5.30 The following figure shows an aerial view of Khan Shaykhun, the impact point of the alleged chemical munition (point 1) and three other impact points reported at around the same time (point 2, point 3, and point 4). All of those (figures 5 to 7) were derived from the interviews.

5.31 The team noted that a fifth impact point was reported to the south of the built up area, but was outside of the city and not included below.

FIGURE 5: NORTHERN KHAN SHAYKHUN INDICATION IMPACT POINT 1, DERIVED FROM INTERVIEWS AND RECEIVED EVIDENCE

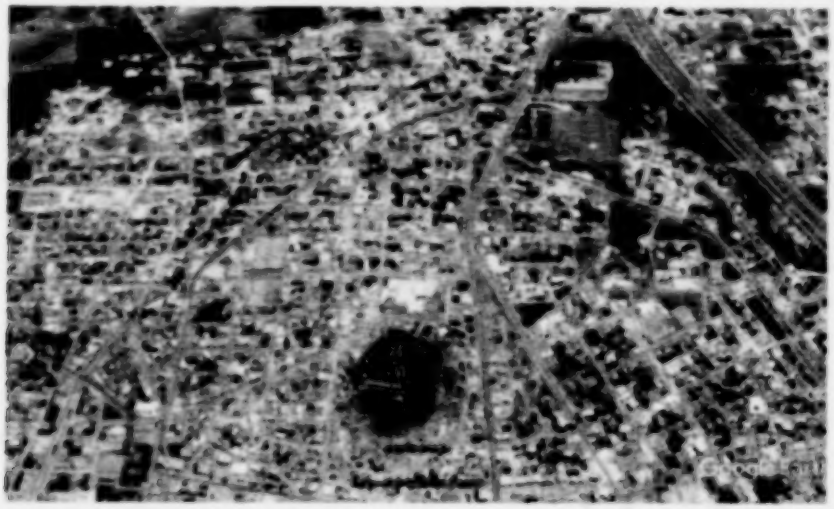


FIGURE 6: AERIAL VIEW OF KHAN SHAYKHUN SHOWING IMPACT POINTS DERIVED FROM INTERVIEWS AND RECEIVED EVIDENCE

5.32 The following figure shows an aerial view of Khan Shaykhun, the initial impact point (see above), and the area (yellow shading) where casualties originated.

FIGURE 7: AERIAL VIEW OF KHAN SHAYKHUN SHOWING THE INITIAL IMPACT POINT AND ORIGIN OF CASUALTIES, AS DERIVED FROM INTERVIEWS AND RECEIVED EVIDENCE

Information, evidence and testimony related to autopsies

5.33 The FFM was informed that three people who had been transferred to a neighbouring country from Khan Shaykhun had died, and that the FFM could attend their autopsies.

5.34 A two-member team attended autopsies of the three victims. They observed the autopsies and witnessed the collection, by pathology staff, of biomedical specimens (comprising brain, hair, liver, lung, and haemolysed blood) from the three fatalities. The team noted that the bodies were intact and, aside from one victim having been intubated, showed no signs of traumatic injury and had no broken bones.

5.35 On 8 April 2017, those specimens were transported to the OPCW Laboratory. Upon receipt at the OPCW Laboratory, specimens were split in accordance with OPCW procedures and subsequently transferred to two laboratories designated for the analysis of authentic biomedical samples.

5.36 The Secretariat received the autopsy reports from a neighbouring country in the original language, on 12 May 2017. The FFM received the translated versions of the autopsy reports on 9 June 2017. The contents of autopsy records are summarised in the following paragraphs.

5.37 The aforementioned three individuals had been transferred from Syria to either hospital MF-A or MF-C in a neighbouring country. All three were pronounced dead on 5 April 2017, and an initial examination was carried out for all three fatalities.

5.38 Based on the initial findings, in all three cases it was recommended that "a classic autopsy has to be performed in order to determine the exact cause of death and for this classic autopsy the body has to be sent to" a forensic department in another city in a neighbouring country.

5.39 The reports, inter alia, gave details of both internal and external examinations in addition to the results of toxicological analysis.

5.40 The final conclusion of all three autopsy reports confirmed that, on the basis of the forensic examinations, autopsy findings, and laboratory results, the cause of death was due to exposure to toxic gas.

Information, evidence and testimony related to Medical Facility A

5.41 The team visited Medical Facility A (MF-A) on Saturday, 8 April 2017. MF-A is located in a neighbouring country and received casualties related to the attacks in Khan Shaykhun that occurred on 4 April 2017. On arrival at MF-A, the team was informed that all patients who had been admitted with symptoms of chemical poisoning had been discharged the previous day.

5.42 The team interviewed a doctor who had been involved in the treatment of the patients. The following is an account from the doctor.

5.43 The doctor reported that the hospital admitted 38 injured that came from Syria. After initial care, 18 were transferred to other hospitals. From the remaining 20 patients, all but one (who continued vomiting for two more days) reported feeling better the following day. All patients survived, were subsequently discharged, and returned to Syria.

Information, evidence and testimony related to Medical Facility B

5.44 The team visited Medical Facility B (MF-B) on Saturday, 8 April 2017. MF-B is located in a neighbouring country and received casualties related to the attacks in Khan Shaykhun that occurred on 4 April 2017. On arrival at MF-B, the team was informed that all but one of the remaining patients who had been admitted with symptoms of chemical poisoning were in intensive care or were otherwise unable to be interviewed.

5.45 The FFM witnessed the collection of biomedical specimens by hospital staff from six patients. Blood samples were collected from all six patients, and urine samples from three.

5.46 Blood was separated in-country into plasma and cells, and then divided into three aliquots from each person. The samples were received at the OPCW Laboratory on 12 April 2017. The urine samples, where sufficient quantity was available, were split into three aliquots by the OPCW Laboratory, and the urine samples and blood samples were

repackaged and transported to two laboratories designated for the analysis of authentic biomedical samples.

5.47 The team was able to conduct one short interview with a casualty. The testimony is included in the earlier narrative. The interviewee further reported that after having been involved in the rescue of casualties in Khan Shaykhun, he remembers going to a shelter, before waking in his current location at MF-B.

Information, evidence and testimony related to Medical Facility C

5.48 The team visited Medical Facility C (MF-C) on Saturday, 8 May 2017. MF-C is located in a neighbouring country and received casualties related to the attacks in Khan Shaykhun that occurred on 4 April 2017. On arrival at MF-C, the team was informed that all remaining patients who had been admitted with symptoms of chemical poisoning were in intensive care or were otherwise unable to be interviewed.

5.49 The FFM witnessed the collection of biomedical specimens by hospital staff from four patients. Blood samples were collected from all four patients, and urine samples from two.

5.50 Blood was separated in-country into plasma and cells, and then divided into three aliquots from each individual. The samples were received at the OPCW Laboratory on 12 April 2017. The urine samples, where sufficient quantity was available, were split into three aliquots by the OPCW Laboratory, and the urine samples and blood samples were repackaged and transported to two laboratories designated for the analysis of authentic biomedical samples

Information, evidence and testimony related to Medical Facility D

5.51 The team interviewed two doctors who worked at Medical Facility D (MF-D), which is a hospital located in Syria. The following is a summary of their testimony.

5.52 As reported to the team, 75 casualties and around 20 deceased individuals were transported to MF-D. The signs and symptoms, including the severity of symptoms of the 75 casualties on presentation, are depicted in the following figures.

5.53 The FFM notes that the determination of the severity of symptoms depends on the determination made by the particular doctor and/or hospital, and is not necessarily comparable to the determination made by others.

FIGURE 8: SEVERITY OF SYMPTOMS FOR CASUALTIES, ON PRESENTATION

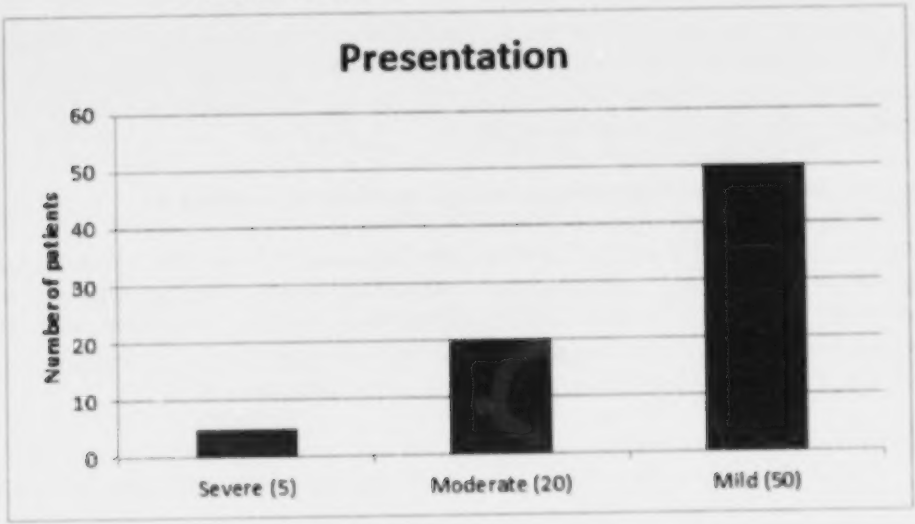
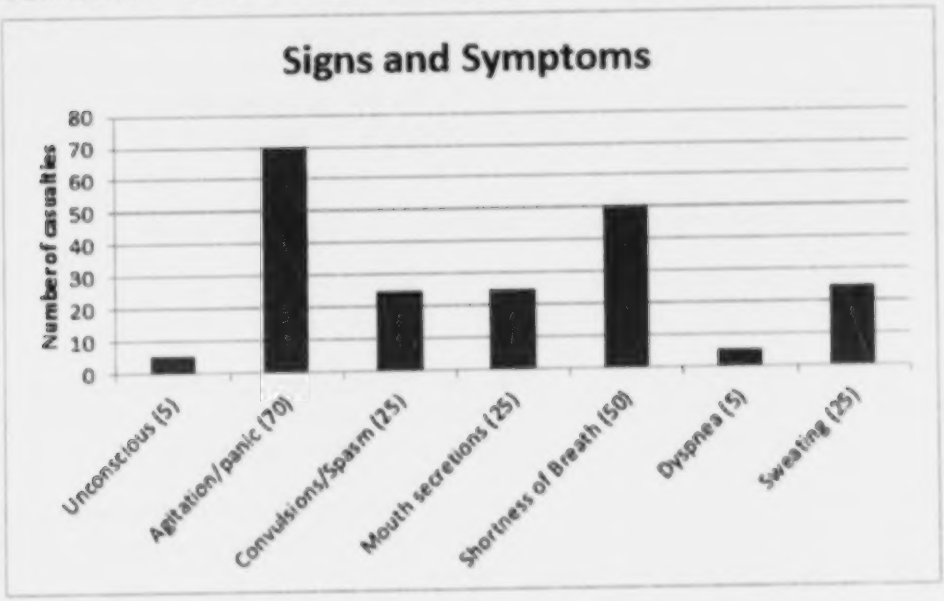
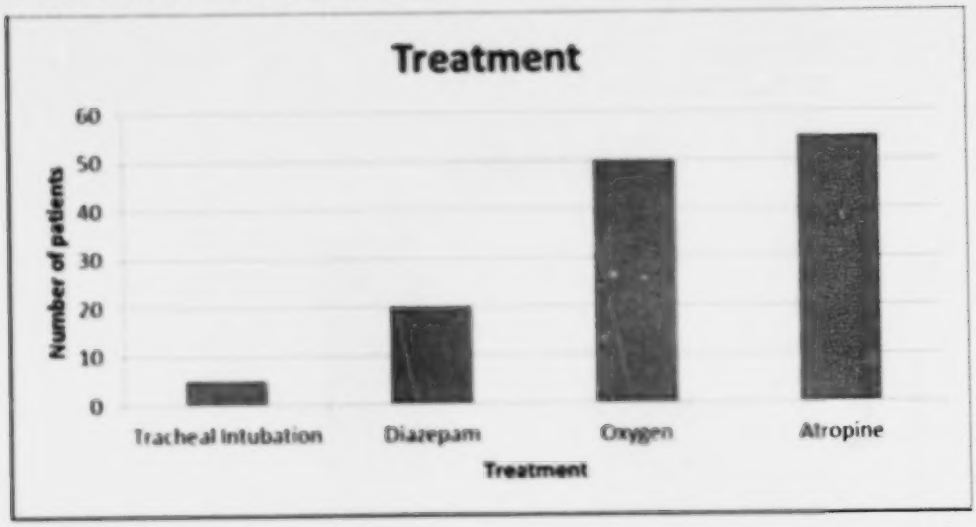


FIGURE 9: SIGNS AND SYMPTOMS OF CASUALTIES



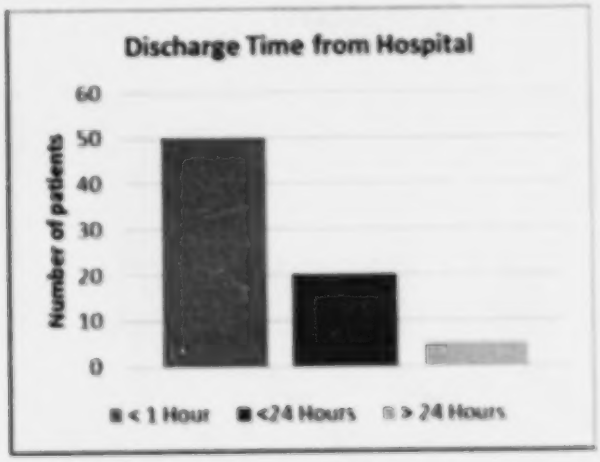
5.54 The medical treatment given to the casualties is shown in the following figure.

FIGURE 10: MEDICAL TREATMENT GIVEN TO CASUALTIES



5.55 The following figure shows the discharge time of patients after arrival at MF-D

FIGURE 11: DISCHARGE TIME FROM TIME OF ARRIVAL AT MF-D



5.56 Specimens of blood, urine, secretions, and hair were provided from casualties treated by this hospital.

Information, evidence and testimony related to Medical Facility E

5.57 The team interviewed one doctor who worked at Medical Facility E (MF-E). The following is a summary of his testimony.

5.58 As reported to the team, 20 casualties were received by MF-E. The signs and symptoms, including the severity of symptoms of the 20 casualties on presentation, are depicted in the following figures.

FIGURE 12: SEVERITY OF SYMPTOMS FOR CASUALTIES, ON PRESENTATION

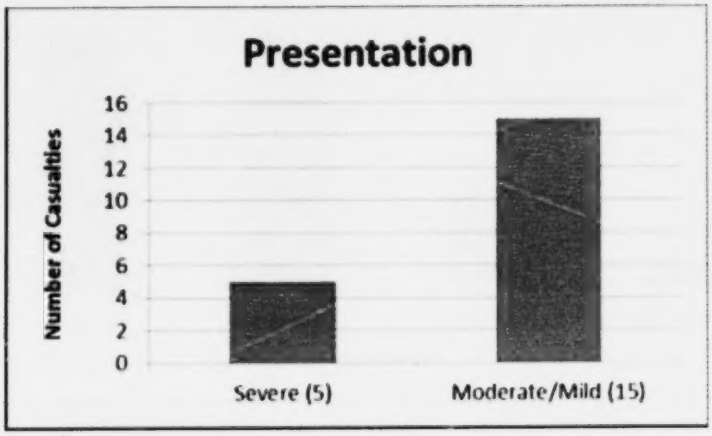
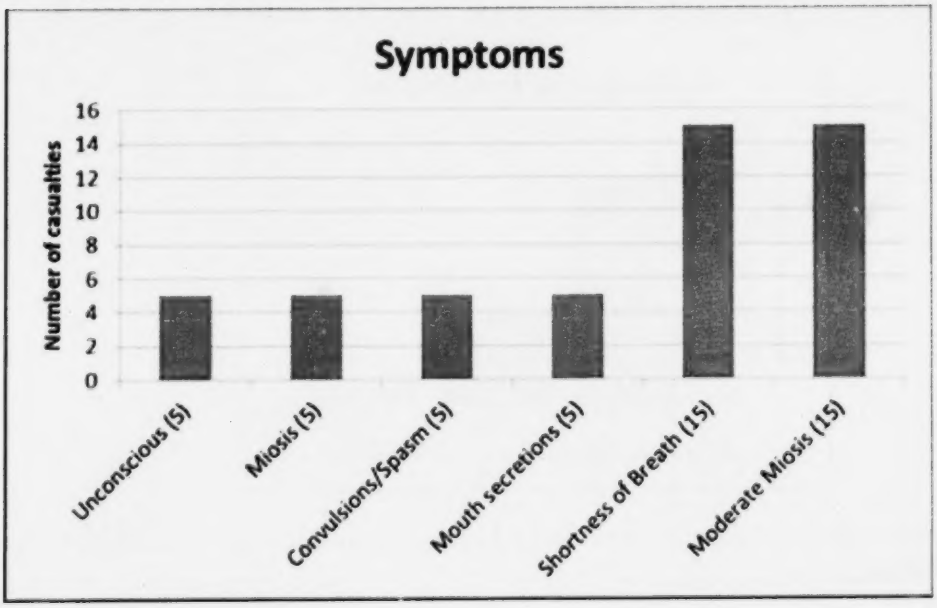
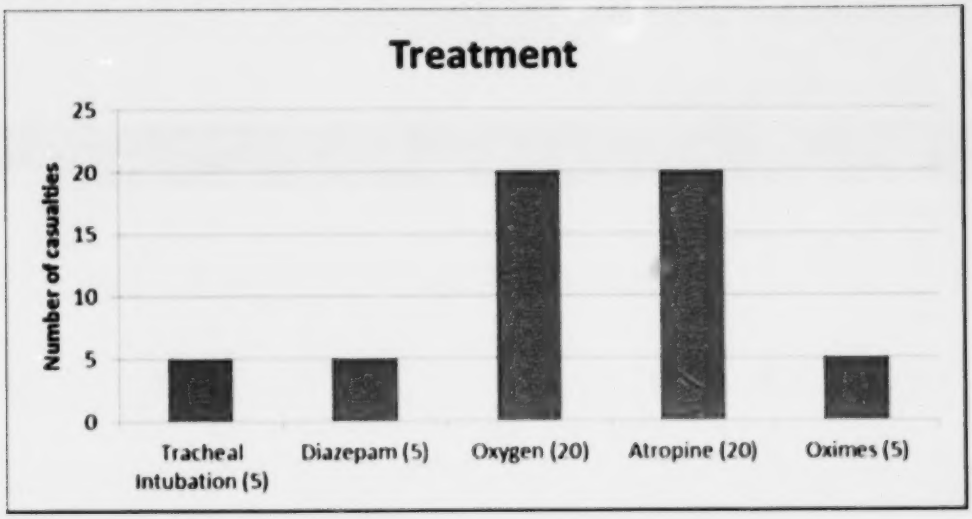


FIGURE 13: MEDICAL SYMPTOMS OF CASUALTIES



5.59 The treatment given to the casualties is shown in the following figure.

FIGURE 14: MEDICAL TREATMENT GIVEN TO CASUALTIES



5.60 No biomedical specimens were provided from this medical facility.

Information, evidence and testimony related to Medical Facility H

5.61 The team interviewed one doctor who was on duty at Medical Facility H (MF-H) when casualties started to arrive. The following is a summary of his testimony. The doctor did not have details or records of casualties related to the whole medical facility, aside from the number of deceased, and described the casualties who he personally attended to.

5.62 He initially received six casualties: three women, two children, and one man. The three women were dead on arrival. One child and the adult man recovered. The outcome of the other child is unknown.

5.63 Although he did not recall the precise number of exposed patients, he reported that about 40 – 60 cases were admitted to the hospital; of that number, 18 died in the first hour, and six died during the second hour.

5.64 All patients received intravenous cannulation, hydrocortisone, atropine, and oxygen. Approximately three needed diazepam and 16 received orotracheal intubation.

Analysis of the incident of 4 April 2017

5.65 A total of 34 interviews were completed between 8 April and 22 June 2017. The details of these interviewees are provided in the table below.

TABLE 1: INTERVIEWEE DETAILS

	Interviewee	Male	Female	Primary casualty	Secondary casualty
Treating physicians	5	5	0	0	1
Nurse	6	5	1		2
First responders	8	8	0	2	4
Witness	14	10	4	5	3
Sampler	1	1	0	0	0
Total	**34**	**29**	**5**	**7**	**10**

Analysis of medical signs and symptoms

5.66 In general terms, symptoms vary according to time of exposure, purity and type of chemical agent, and route of exposure.

5.67 With respect to the alleged incident in Khan Shaykhun on 4 April 2017, the main route of exposure was likely inhalation (see Annex 5), the duration of exposure in relation to the involvement is varied, and the onset of symptoms varied among different people.

5.68 People who were in close proximity to the dispersion point presented earlier, severe, and sudden symptoms, including rapid death. Others presented delayed, generally milder, symptoms.

5.69 Common symptoms recorded by casualties, rescuers or medical staff, either as witnesses or in medical records were: confusion, muscular weakness, chest tightness, dizziness, headache, vomit, shortness of breath, blurred vision, pinpoint pupils, convulsions or muscular spasms, profuse sweating, eye burning, and suffocation. Some casualties reported frequent urination and a state of agitation.

5.70 The onset of symptoms in relation to the incident varied from immediate to delayed by a few hours, depending on the distance from the dispersion point and the duration of exposure. Some of the casualties included medical staff and ambulance drivers, who were not present at the site.

Onset in relation to the allegation

5.71 The symptoms presented, their duration, and response to medications are consistent with acetylcholinesterase inhibition. This is corroborated by a laboratory analysis of the blood, urine, and specimens collected from the victims and casualties, which confirmed the presence of sarin or a sarin-like substance.

Analysis of medical records

5.72 The team collected a number of patient records, death certificates, and other medical documents from medical facilities throughout northern Syria, collected from medical NGOs, the Idlib Health Directorate (IHD), and the Khan Shaykhun Medical Centre.

5.73 Variations in the procedures used by different medical staff and hospitals for the collection and categorisation of patient information and medical records resulted in variations in the reporting of patient information, such as, for example, the priority assigned to the severity of patient presentation.

5.74 Different medics at different hospitals also provided treatment according to personal experience and availability of medicines.

5.75 The team reviewed all available records relating to those who had died and noted that several people were duplicated in other records. The team removed all the duplicates, leaving approximately 10 where it was unclear whether they were duplicates or just similarly named people.

5.76 Conversely, the team did not cross check the records where they related to casualties. Therefore, there is a significant likelihood of duplication of names from different sources.

Cumulative summary of medical records collected by the IHD and other medical facilities in Syria

5.77 The following figures summarise data from records supplied by the IHD. The numbers of those exposed also include fatalities. As indicated above, the likelihood that some patients registered in Khan Shaykhun were also referred to one or more different hospitals due to the permanence of symptoms and may have therefore been recorded twice, cannot be excluded.

FIGURE 15: NUMBER OF THOSE EXPOSED, ACCORDING TO AGE RANGE

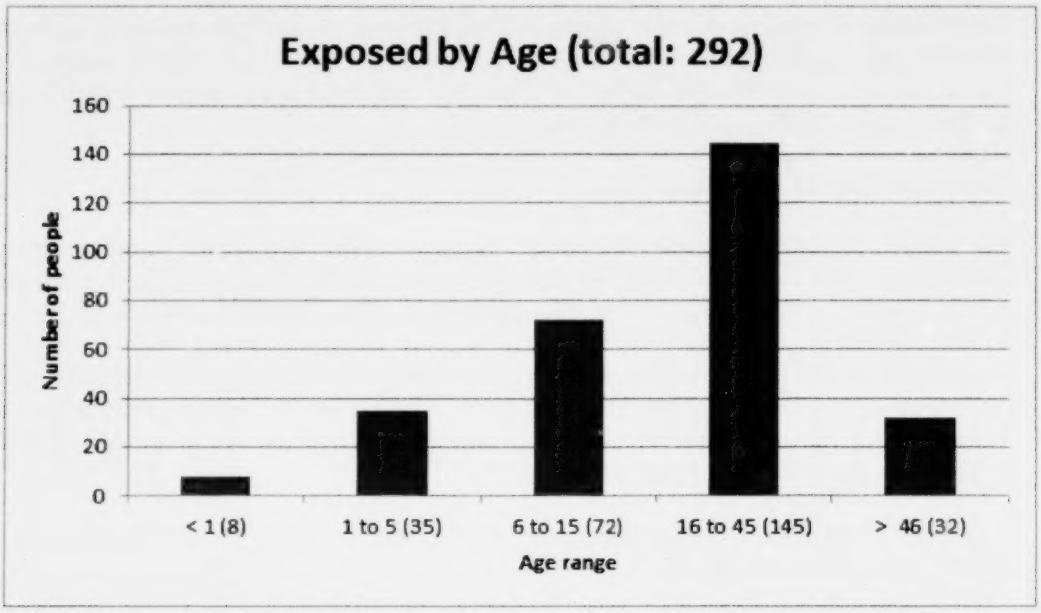


FIGURE 16: NUMBER OF FATALITIES, ACCORDING TO AGE RANGE

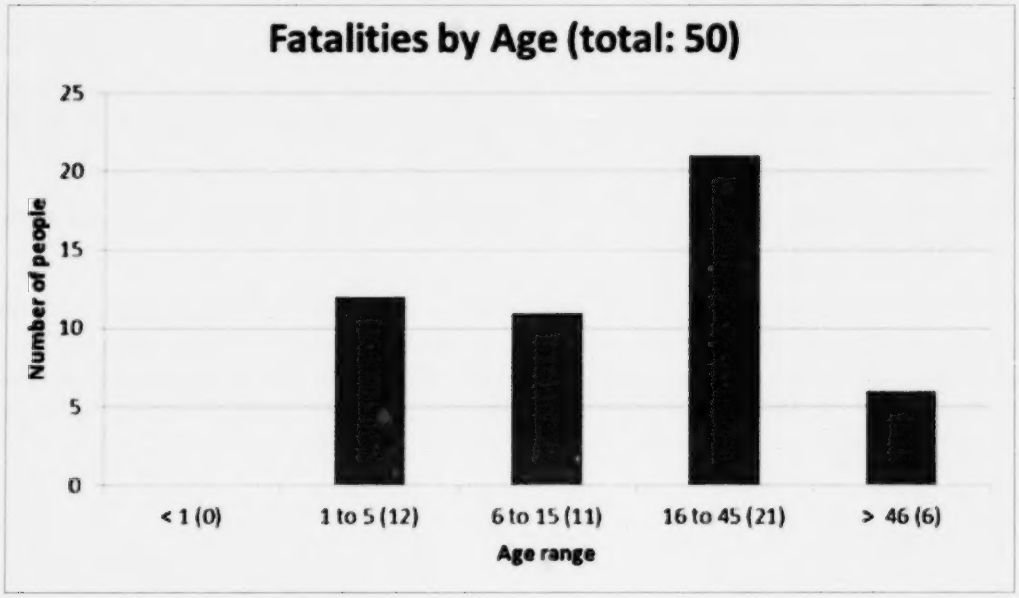


FIGURE 17: NUMBER OF FATALITIES, ACCORDING TO GENDER

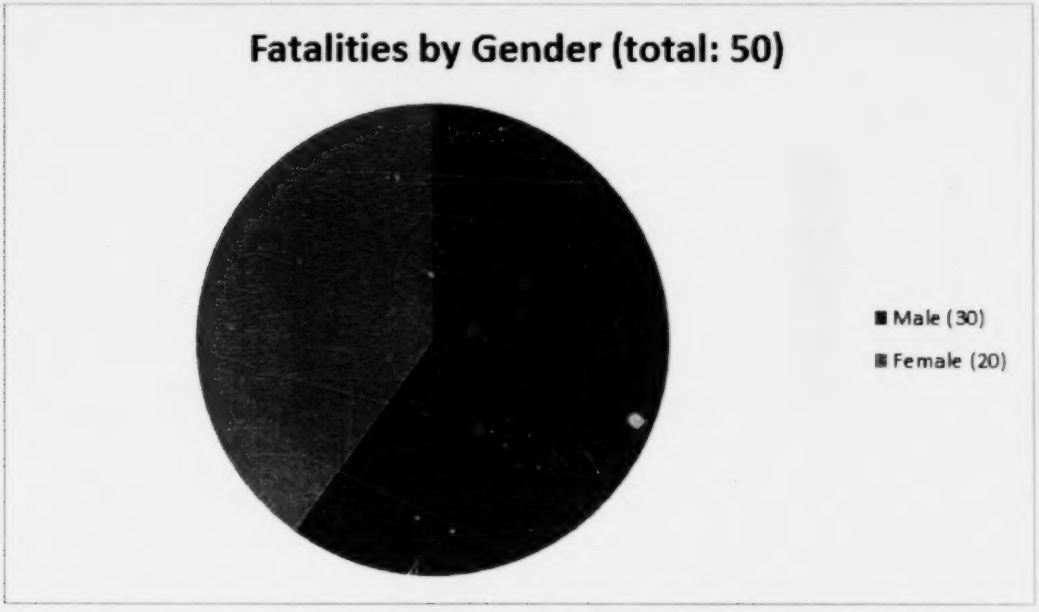


FIGURE 18: SYMPTOMS REPORTED IN RELATION TO CASUALTIES

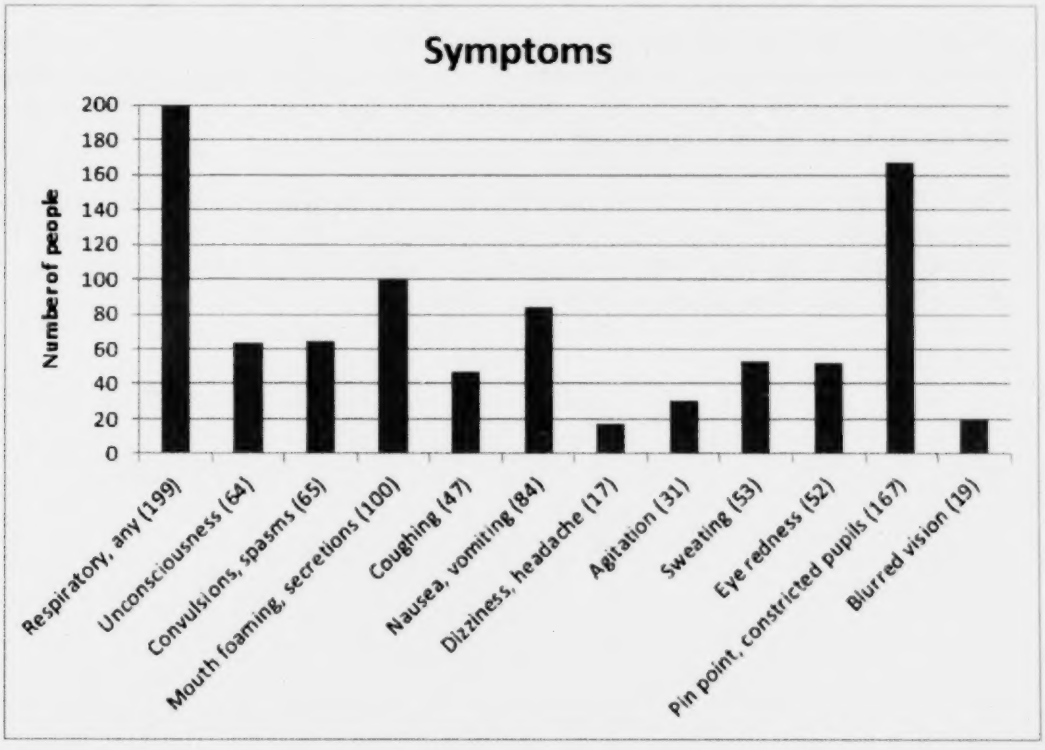
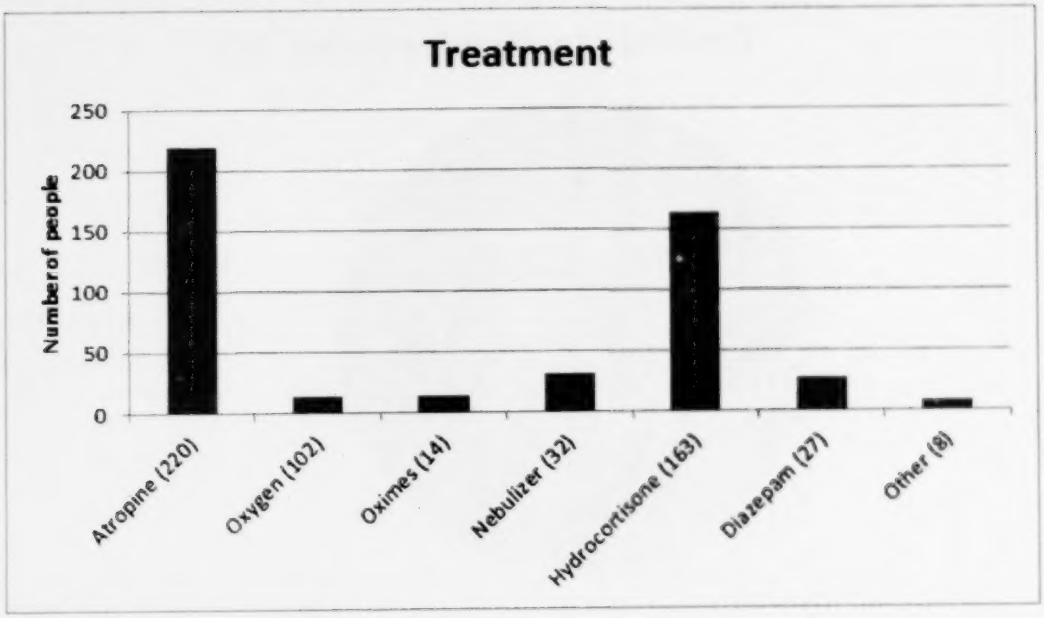


FIGURE 19: MEDICAL TREATMENT GIVEN TO CASUALTIES



Summary of medical records collected by Khan Shaykhun Medical Centre

5.78 Given its location as the closest medical facility to the alleged incident, in addition to the fact that it dealt with the first cases of exposure and that many of the fatalities were temporarily located in a building nearby this medical centre, the statistics recorded for this location are reported separately.

5.79 The following figures summarise the data registered by Khan Shaykhun Medical Centre. The numbers of those exposed also include fatalities. There is some overlap of people between those identified in the records from Khan Shaykhun Medical Centre and those from other medical facilities in Idlib Governorate.

FIGURE 20: NUMBER OF THOSE EXPOSED, ACCORDING TO AGE RANGE

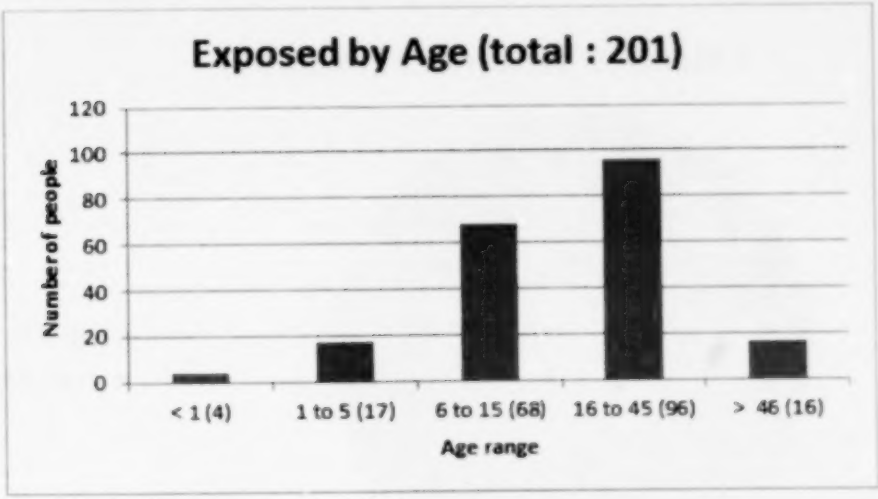


FIGURE 21: NUMBER OF FATALITIES, ACCORDING TO AGE RANGE

FIGURE 22: NUMBER OF FATALITIES, ACCORDING TO GENDER

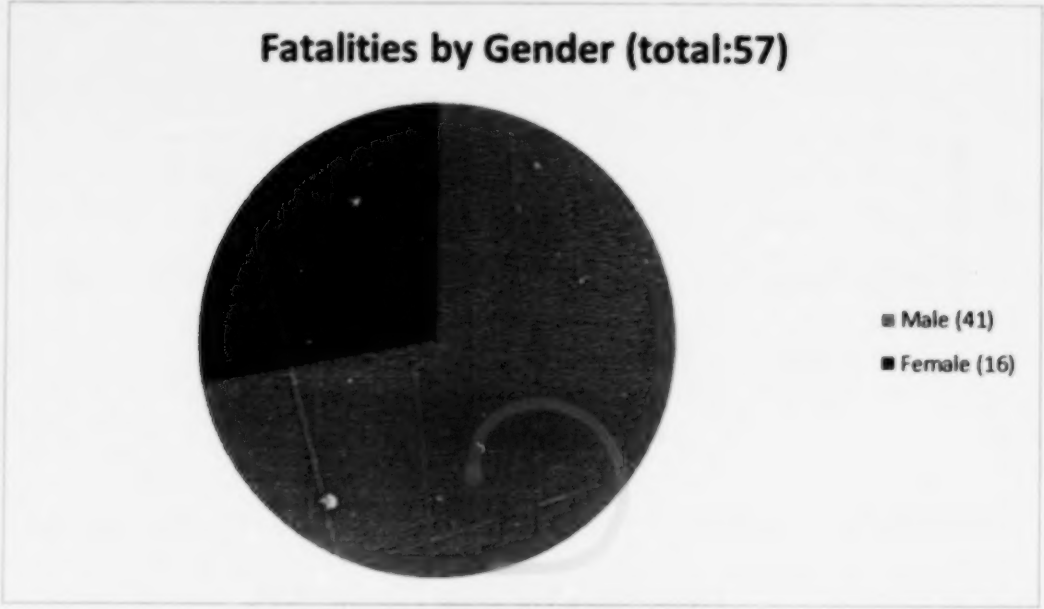
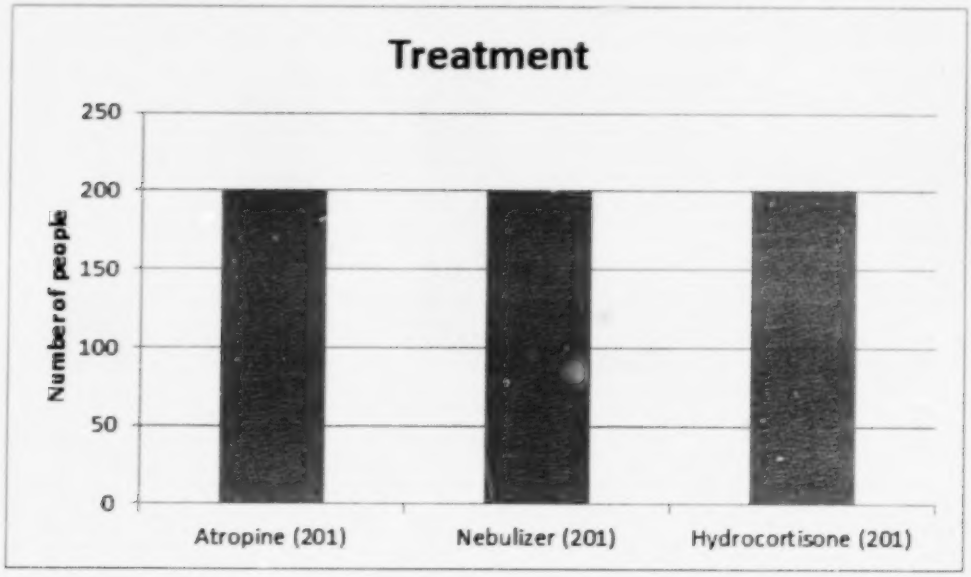


FIGURE 23: MEDICAL TREATMENT GIVEN TO CASUALTIES



5.80 A total number of 107 fatalities were reported. The FFM noted that there were some potential duplicate names and therefore estimated the number of fatalities as approximately 100 people.

Report of biomedical specimens

5.81 Biomedical specimens were analysed at two DLs. Results from the analyses from each laboratory were in agreement.

5.82 Table 2 summarises the results from the analyses of specimens taken at autopsies and demonstrate that biomedical specimens from all three fatalities indicate exposure to sarin or a sarin-like substance.

TABLE 2: AUTOPSY RESULTS

No.	Person Reference	Blood		Brain		Hair		Liver		Lung	
		Sample Reference	Analysis Results	Sample Reference	Analysis Results	Sample Reference	Analysis Results	Sample Reference	Analysis Results	Sample Reference	Analysis Results
1.	683	683/Blood	Positive for sarin or sarin-like substance	683/Brain	Positive for sarin or sarin-like substance	683/Hair	Positive for sarin or sarin-like substance	683/Liver	Positive for sarin or sarin-like substance	683/Lung	Positive for sarin or sarin-like substance
2.	684	684/Blood	Positive for sarin or sarin-like substance	684/Brain	Positive for sarin or sarin-like substance	684/Hair	**Negative** for sarin or sarin-like substance	684/Liver	Positive for sarin or sarin-like substance	684/Lung	Positive for sarin or sarin-like substance
3.	685	685/Blood	Positive for sarin or sarin-like substance	685/Brain	Positive for sarin or sarin-like substance	685/Hair	Positive for sarin or sarin-like substance	685/Liver	Positive for sarin or sarin-like substance	685/Lung	Positive for sarin or sarin-like substance

5.83 Table 3 summarises results from samples collected, where the collection of samples was witnessed by FFM team members. Samples from the first 10 people were taken in hospitals located in a neighbouring country on 8 April 2017. The sample from the eleventh person (reference number 1385) was taken on 1 May 2017, based on information supplied during the interview of reference number 1385 and records supplied by the IHD. Further details regarding person reference 1385 are provided later in this report.

5.84 Indication of N/A (not applicable) in the 'Sample Reference' column indicates that either no sample was possible, or the team chose not to take the sample.

TABLE 3: BIOMEDICAL RESULTS FROM SAMPLES, WHERE THE SAMPLING WAS WITNESSED BY THE FFM TEAM

No	Person Reference	Blood		Urine	
		Sample Reference	Analysis Results	Sample Reference	Analysis Results
1.	1321**	1321/P	Positive for sarin or sarin-like substance	N/A	N/A
2.	1355	1355/P	Nothing detected	1355/U	Nothing detected
3.	1305	1305/P	Positive for sarin or sarin-like substance	N/A	N/A
4.	1304*	1304/P	Positive for sarin or sarin-like substance	N/A	N/A
5.	1353	1353/P	Positive for sarin or sarin-like substance	N/A	N/A
6.	1356**	1356/P	Positive for sarin or sarin-like substance	1356/U	Isopropyl methylphosphonate
7.	1302	1302/P	Nothing detected	N/A	N/A
8.	1354	1354/P	Nothing detected	1354/U	Nothing detected
9.	1320	1320/P	Positive for sarin or sarin-like substance	1320/U	Isopropyl methylphosphonate
10.	1358	1358/P	Positive for sarin or sarin-like substance	1358/U	Isopropyl methylphosphonate
11.	1385***	1385/P	Positive for sarin or sarin-like substance	N/A	N/A

* Interviewed in hospital
** Interviewed at a later date
*** Interviewed by team, prior to taking blood sample

5.85 Of the blood samples taken from eleven individuals, eight tested positive for exposure to sarin or a sarin-like substance. Similarly, of urine samples taken from five individuals, three tested positive for exposure to sarin or a sarin-like substance.

5.86 At the time samples were taken, the team noted that one of the ten casualties from the samples taken in hospitals appeared to have trauma-related injuries and further noted that his blood and urine tested negative for sarin or sarin-like substances. Seven of the remaining nine blood samples and three of the remaining four urine samples tested positive for sarin or a sarin-like substance or related metabolites.

Results from biomedical specimens taken in Syria

5.87 Table 4 summarises results from specimens taken, where the taking of specimens was not witnessed by FFM team members. Samples numbered 1 to 7 in Table 4 were taken by medical staff under the auspice of the IHD; samples numbered 8 to 14 in Table 4 were taken under the auspice of SAMS. These were handed over to the FFM together with supporting documentation.

TABLE 4: BIOMEDICAL RESULTS FROM SAMPLES, WHERE SAMPLING WAS NOT WITNESSED BY THE FFM TEAM

No	Person Reference	Blood		Urine		Hair		Secretion	
		Sample Reference	Analysis Results	Sample Reference	Analysis Results	Sample Reference	Analysis Results	Sample Reference	Analysis Results
1	1351A	1351A1 1351A2	Positive for sarin or sarin-like substance	1351A3	Isopropyl methylphosphonate	1351A4	Isopropyl methylphosphonate*	N/A	N/A
2	1351B	1351B1 1351B2	Positive for sarin or sarin-like substance	N/A	N/A	N/A	N/A	N/A	N/A
3	1351C	1351C1 1351C2	Positive for sarin or sarin-like substance	1351C3	Isopropyl methylphosphonate	N/A	N/A	N/A	N/A
4	1351D	1351D1 1351D2	Positive for sarin or sarin-like substance	1351D3	Isopropyl methylphosphonate	N/A	N/A	N/A	N/A
5	1351E	1351E1 1351E2	Positive for sarin or sarin-like substance	N/A	N/A	N/A	N/A	N/A	N/A
6	1351F	1351F1 1351F2	Positive for sarin or sarin-like substance	1351F3	Isopropyl methylphosphonate	N/A	N/A	N/A	N/A
7	1351G	1351G1 1351G2	Positive for sarin or sarin-like substance	1351G3	Isopropyl methylphosphonate	1351G4	Isopropyl methylphosphonate	N/A	N/A
8	131803	131803	Positive for sarin or sarin-like substance	N/A	N/A	131801	Isopropyl methylphosphonate	131802	Isopropyl methylphosphonate
9	131806	131806	Positive for sarin or sarin-like substance	N/A	N/A	131804	Isopropyl methylphosphonate	131805	Isopropyl methylphosphonate
10	131809	131809	Positive for sarin or sarin-like substance	N/A	N/A	131807	Isopropyl methylphosphonate	131808	Isopropyl methylphosphonate

No	Person Reference	Blood		Urine		Hair		Secretion	
		Sample Reference	Analysis Results	Sample Reference	Analysis Results	Sample Reference	Analysis Results	Sample Reference	Analysis Results
11	131815	131814	**Negative** for sarin or sarin-like substance	131813	Isopropyl methylphosphonate	131811	Isopropyl methylphosphonate	131812	Nothing detected
12	131821	131820	**Negative** for sarin or sarin-like substance	131816	Nothing detected	131818	Isopropyl methylphosphonate	131817	Nothing detected
13	131826	131825	**Negative** for sarin or sarin-like substance	131827	Isopropyl methylphosphonate	131823	Isopropyl methylphosphonate	131824	Nothing detected
14	131830	131830	Positive for sarin or sarin-like substance	N/A	N/A	131829	Isopropyl methylphosphonate	131828	Isopropyl methylphosphonate**

*Trace level: less than 1 ng/g

** Trace level: less than 1 ng/ml

5.88 Blood from 11 of the 14 samples tested positive for sarin or a sarin-like substance. Those positive results were in part corroborated by other biomedical samples from the same person.

5.89 The team noted that the blood of person reference numbers 131814, 131820, and 131825 tested negative for sarin or sarin-like substances, yet other biomedical specimens from the same people tested positive for isopropyl methylphosphonate.

5.90 The team further noted that the name associated with person reference number 1351B (Table 4) had the same name as witness number 1385 (Table 3). On the basis of these same names, the team asked witness 1385 if he would be willing to give the team a blood sample in order to confirm whether he was the same person and whether his blood, taken under full custody of the FFM team, confirmed exposure to sarin or a sarin-like substance. Those specimens, for the purpose of reporting, had been assigned identity code D1.

5.91 Similarly, the team noted that the name associated with person reference number 131806 (Table 4) had the same name as person reference number 1320 (Table 3). Having already received analysis results for both these samples that were positive for sarin or a sarin-like substance, the FFM identified value in confirming whether those two samples did indeed relate to the same person. Those samples, for the purpose of reporting, had been assigned identity code D2.

Tracking casualties

5.92 The FFM requested DNA analysis of the blood samples from person reference numbers 1351B (D1), 1385 (D1), 131806 (D2), and 1320 (D2). Table 5 shows the results of those analyses.

TABLE 5: BIOMEDICAL RESULTS FROM SAMPLES, WHERE SAMPLING WAS NOT WITNESSED BY THE FFM TEAM

No	Sample Reference	Samples taken under custody of:	Identity code	Blood Analysis Results	The random match probability
1.	1385B	FFM	D1	Samples 1385B (from person 1385) and 1351B originate from the same individual*	$< 1x10^{9}$
2.	1351B	IHD			
3.	131806	SAMS	D2	Samples 131806 and 1320B (from person 1320) originate from the same individual*	$< 1x10^{9}$
4.	1320B	FFM			

*An exception to this conclusion where all samples are from males is identical twin brothers. Identical twins have matching short tandem repeat (STR) DNA profiles. Therefore, STR DNA analysis cannot discriminate between individuals who are identical twins.

5.93 Based on comparison of DNA analysis of a blood sample taken under the custody of the IHD and a blood sample taken under the custody of the FFM, both of whom were identified with the same name, the FFM confirms that both samples are from the same person.

5.94 Based on comparison of DNA analysis of a blood sample taken under the custody of SAMS and a blood sample taken under the custody of the FFM, both of whom were identified with the same name, the FFM confirms that both samples are from the same person.

5.95 As indicated in the tables above showing biomedical results, those four samples also tested positive for sarin or a sarin-like substance. Those results enabled the team to assess the link between the site of the allegation, exposure, and witness testimony. Furthermore, the results can be used to assess the credibility of samples taken under the custody of others.

5.96 Amongst the video footage reviewed by the team, there were scenes in which one of the deceased from the autopsy was also shown in the footage. The video footage was handed over and reviewed during an interview, and the context of the footage was described by the interviewee. The interviewee made no reference to the person from the autopsy.

5.97 Autopsy records from the autopsies attended by the FFM indicate that these three people were transferred from Syria to hospitals in a neighbouring country prior to their deaths and subsequent autopsies. In addition, a review of the records from the IHD indicated from the names that two of the fatalities from the three autopsies were initially transferred from Syria to a neighbouring country for treatment.

5.98 Table 6 summarises all the blood samples taken from casualties, and indicates who had custody of the samples, the results of sample analysis, and whether individuals were interviewed. The DNA analysis is also included in the table.

TABLE 6: TRACKING SUMMARY OF BIOMEDICAL SAMPLES

	Samples collected and analysis results, as determined by DLs						
	Sample Reference	Additional Analysis	Hospital (Witnessed by FFM)	SAMS	IHD	Interview location (Witnessed by FFM)	Interviewed
1	1355		Negative				
2	1302		Negative				
3	1354		Negative				
4	1321		Positive				Yes
5	1304		Positive				Yes
6	1305		Positive				
7	1353		Positive				
8	1356		Positive				Yes
9	1358		Positive				
10	1320	DNA matched	Positive				
	131806			Positive			
11	131803			Positive			
12	131809			Positive			
13	131830			Positive			
14	131815			Inconclusive			
15	131821			Inconclusive			
16	131826			Inconclusive			
17	1351A				Positive		
18	1351C				Positive		
19	1351D				Positive		
20	1351E				Positive		
21	1351F				Positive		
22	1351G				Positive		
23	1351B	DNA matched			Positive		Yes
	1385					Positive	

Positive = Positive for sarin or sarin-like substance
Negative = negative for sarin or sarin-like substance

Environmental samples and other samples from the site

5.99 Environmental samples, two dead birds, and hair from a dead goat were received by the FFM team on 12 and 13 April 2017. Anatomical parts and internal organs from the birds were removed and taken by the team upon their receipt.

5.100 At the time of handover, the team was informed that all samples provided on 12 and 13 April 2017 were taken by the chemical sample unit of the SCD. A member of the chemical sample unit who took the samples was present at the handover and provided information on every sample. This information was supported by interviewing the same person a few days later and with photographs handed over at an interview. This information was corroborated by testimony from other witnesses.

5.101 Table 7 below shows the analysis results of scheduled chemicals and other chemicals of interest according to the "Scope of Analysis env 3" L/VER/LAB/209626/17, dated 25 April 2017.

TABLE 7: ANALYSIS FROM DESIGNATED LABORATORIES

No	Sample code	Description	Analysis Results	
			DL #1	DL #2
Samples from medical facility				
1.	10SDS	Clothes	n.d.	
2.	11SDS	Clothes		Hexamine (trace)
3.	12SDS	Clothes	n.d.	
4.	13SDS	Clothes		n.d.
5.	14SDS	Clothes	n.d.	
Samples from the impact point of the alleged munition and the surrounding area				
6.	15SDS	Vegetation 10m from location	IMPA, DIMP	IMPA, MPA, DIMP, hexamine, DIPP
7.	17SLS	Soil from crater	Sarin, IMPA, DIMP, hexamine, pyro	Sarin, IMPA, MPA, DIMP, hexamine, DIPF, HFP, DIPP, TPP
8.	18SLS	Rock from location	Sarin, IMPA, DIMP, hexamine	IMPA, MPA, DIMP, hexamine, HFP, DIPF (trace), DIPP
9.	19SLS	Soil 100m away	IMPA, DIMP	IMPA, MPA, DIMP, DIPP
10.	20SLS	Soil 50m away	IMPA, DIMP	Sarin (trace), IMPA, MPA, DIMP, DIPF (trace), DIPP, TPP (trace)

No	Sample code	Description	Analysis Results DL #1	DL #2
Specimens from dead animals found near the impact point				
11.	16SDS	Goat hair, 20 – 30m away	IMPA	IMPA (trace)
12.	22SDS	Bird: feathers	IMPA, DIMP	Sarin (trace), IMPA, MPA, DIMP, hexamine, DIPF (trace), DIPP
13.	46SDS	Bird: feathers	DIMP	DIMP, hexamine (trace)
14.	21SDS	Bird: wings	Sarin, IMPA, DIMP, hexamine, DIPF	
15.	23SDS	Bird: liver		F^- regen
16.	24SDS	Bird: heart	IMPA	
17.	25SDS	Bird: pectoral muscles		F^- regen
18.	46SDS	Bird: feathers and wings		IMPA, DIMP, hexamine
19.	47SDS	Bird: brain	GB-tyr; IMPA, F^- regen	
20.	48SDS	Bird: stomach	IMPA, F^- regen	
21.	49SDS	Bird: Heart		F^- regen

Key for this and subsequent table	
DL	Designated laboratory
n.d.	No detection of relevant chemicals (as defined by the OPCW laboratory)
IMPA	Isopropyl methylphosphonate (first degradation product of sarin)
MPA	Methylphosphonic acid (degradation product of sarin and/or nerve agent precursor and/or nerve agent by-product)
DIMP	Di-isopropyl methylphosphonate (by-product of sarin production)
Pyro	Di-isopropyl dimethylpyrophosphonate (by-product of sarin production)
DIPF	Di-isopropyl phosphorofluoridate (by-product of sarin precursor/sarin production)
DIPP	Diisopropyl phosphate
HFP	Hexafluorophosphate
TPP	Tri-isopropyl phosphate (by-product of sarin precursor/sarin production)
F^- regen	Fluoride regeneration method: positive for sarin or sarin-like substance
GB-tyr	Tyrosine adduct of sarin or sarin-like substance
EIMP	Ethyl isopropyl methylphosphonate
Hexamine	Hexamethylentetramine

5.102 The FFM notes that the interviewees who collected the clothing (items 1 to 5 in Table 7), collected it on the basis of its availability, rather than any views that it may be contaminated.

5.103 Representatives of the Government of the Syrian Arab Republic informed the FFM that samples relating to the alleged incident in Khan Shaykhun were provided to them by an unnamed volunteer from Khan Shaykhun. The FFM collected fractions of these samples

from the SSRC in Barzah on 18 June 2017. A video recording of the collection of the samples was provided to the FFM. These environmental samples consist of soil, fragments of metal, bone, and vegetation from different locations, as well as extraction samples from these fragments.

5.104 An analysis of these samples was performed by the SSRC in Barzah, the results of those analyses were provided to the FFM by the Government of the Syrian Arab Republic. The OPCW Laboratory provided a fast screening of the samples before dispatching them to DLs.

5.105 Table 8 below shows the results of analyses as performed by the SSRC in Barzah and by the OPCW Laboratory on the samples provided by the Government of the Syrian Arab Republic.

TABLE 8: ANALYSIS OF SAMPLES PROVIDED BY THE SYRIAN ARAB REPUBLIC

No	Sample code	Description	Analysis Results*	
			SSRC	OPCW Laboratory
Samples from the impact point of the alleged munition and the surrounding area				
1.	01SLS	Soil sample from crater	Sarin, DIMP, hexamine,	Sarin, DIPF, DIMP, hexamine, pyro
2.	02SLS	Soil sample from crater adjacent to sample 01SDS	Sarin, DIMP, hexamine,	Sarin, DIPF, DIMP, TPP, pyro
3.	04SLS	Soil sample 75m north of the silos	n.d.	n.d.
4.	05SLS	Soil sample taken from Khaled Ibn Al Walid Mosque	n.d.	
5.	06SLS	Soil sample taken near the house	n.d.	
6.	07SLS	Soil sample 50m south of the silos	n.d.	
7.	01SDS	Two metal objects from crater	N/A, see 01BLS	Sarin, DIPF, DIMP, TPP, hexamine, pyro
8.	01BLS	DCM extract of 01SDS made by SAR	DIMP, hexamine,	Sarin, DIPF, IMPA, EIMP, DIMP, TPP, hexamine, pyro
9.	10SLS	Soil sample taken from the house	n.d.	
10.	09SLS	Soil sample taken from another Mosque	n.d.	
11.	08SLS	Soil sample from a house	n.d.	
12.	03SLS	Soil sample taken 80m away from crater	DIMP, hexamine,	DIMP
13.	03SDS	Three leaves from different locations	N/A	
14.	03BLS	DCM extract of 03SDS made by SAR	n.d.	

No	Sample code	Description	Analysis Results*	
			SSRC	OPCW Laboratory
15.	02SDS	Bone of animal taken from silos	N/A	
16.	02BLS	DCM extract of 02SDS made by SAR	n.d	
17.	11SLS	Soil sample taken from a house	n.d.	
18.	12SLS	Soil sample from different locations	n.d.	
19.	04SDS	Sample from different locations	n.d.	
20.	01BLB	DCM blank for 01-03BLS		n.d.

* For key, see under Table 7.

5.106 The FFM reviewed the analyses performed by the SSRC in Barzah and the OPCW Laboratory on the same samples, as well as the analyses performed by the DLs on samples received from the chemical sample unit of the SCD. These were all assessed as being broadly consistent.

5.107 The FFM was unable to retrieve any parts that might relate to dispersion of a chemical. However, the FFM was informed that remnants of a munition from the impact crater (point 1 in Figure 5) have been secured and could be made available in the future.

Review of other sources of information

5.108 The FFM noted that open-source information that referred to a chemical incident although there were several explanations as to the cause of the alleged chemical incident, no open-source information (see Annex 2) denies any exposure to toxic chemicals.

5.109 The Secretariat received several Notes Verbales from the Syrian Arab Republic referring to Khan Shaykhun. None of these provided information of significant evidential value.

5.110 The Government of the Syrian Arab Republic provided the FFM with summaries of written statements from three people. These were not included in the earlier narrative.

5.111 The FFM interviewed two of these three people. Their testimony is included in the earlier narrative.

5.112 The other statement indicated that there were no warnings received on the radio, which is normally the case in the event of an attack from the air. At approximately 07:00, he heard three loud explosions and subsequently noted indications of a chemical attack.

Categorisation of evidence

5.113 The FFM considered the following as primary evidence: first hand testimony from interviewees, and biomedical specimens that were collected in the presence of the team and where chain of custody was maintained by the team.

5.114 The FFM considered the following as secondary evidence: documentation, photographs, video and audio recordings provided by interviewees, and samples, including environmental samples, biomedical specimens, and dead or affected creatures that were collected by witnesses and supported by testimony, documents and photographs and/or video.

5.115 The FFM considered the following as tertiary evidence and/or supporting information: samples, of all types, where there is insufficient supporting evidence; testimonies without additional corroboration; open source information; and information supplied by States Parties.

6. CONCLUSIONS

6.1 The methodology has been described earlier in this report. However, due to the ongoing conflict, it was not possible for the site to be secured and the team was not able to visit the site. The team therefore relied on: interviewees, who were either identified by other entities or accessible in hospitals; samples (lacking full chain of custody by the team) as made available by the interviewees; medical records; and biomedical specimens, both those for which the team had full chain of custody and those taken by others.

6.2 Based on media report monitoring, the FFM was ready to mobilise within 24 hours of reports appearing in the media. This capability was critical to being able to attend autopsies before burial, and meet patients whilst there was still a high potential for retrieving relevant biomedical specimens. Thus, specimens could be taken and bio markers in specimens could still be detected before the body metabolised them.

6.3 The FFM was also able to interview witnesses whilst their recollection of events was relatively fresh. Furthermore, the FFM highlights that it has interviewed a greater number of witnesses than would typically be expected for this type of mission. This relatively larger number has enhanced the corroborative value of different testimonies and provided a means of cross-checking the evidence provided. This corroboration has, therefore, imparted greater confidence in the earlier narrative and any resultant conclusions.

6.4 The team was supplied with the reports from the three autopsies. They conclude that the three fatalities were caused by exposure to sarin or a sarin-like substance. In addition to the official reports, specimens were also taken from the corpses in the presence of the team and were analysed by designated laboratories. The results demonstrated that these specimens had been exposed to sarin or a sarin-like substance.

6.5 When viewed in isolation, each individual piece of evidence relating to one autopsy might not completely exclude the possibility of other explanations; however, the combination of evidence and corroboration across all the autopsy related evidence enabled the team to conclude that at least three people who had been transferred from Syria to a neighbouring country shortly after the alleged incident in Khan Shaykhun died as a result of exposure to sarin or a sarin-like substance.

6.6 Although the FFM was only able to interview one patient in hospital at the time the biomedical specimens were collected, it was able to identify two additional patients and interview them at a later date. Through their own testimonies, which were corroborated by other witnesses, the team was able to place them at the site at the time of the alleged incident.

6.7 Biomedical specimens from these three witnesses, in addition to a further four casualties who were also in hospital at the time, tested positive for sarin or a sarin-like substance. The team can confirm, therefore, with the utmost confidence that these seven people were exposed to sarin or a sarin like substance.

6.8 The team received biomedical specimens from seven casualties which were taken under the auspices of the Idlib Health Directorate (IHD). From these seven people, the team identified one person as having the same name as an interviewee. The team took a further blood sample from this person. Analysis of the DNA confirmed that the sample provided by the IHD and the sample taken in the presence of the team were taken from the same person. The sample taken in the presence of the team also tested positive for sarin or a sarin-like substance. Therefore the team can confirm, also with utmost confidence, that this person was exposed to sarin or a sarin-like substance.

6.9 Having reviewed the results in conjunction with the results of the other six specimens, medical records, and witness testimony, the team attached significant credibility to the results obtained from the other six people. As such, the FFM confirms that these six people were exposed to sarin or a sarin-like substance.

6.10 The team received biomedical specimens from seven casualties that were collected under the auspice of Syrian American Medical Society. As indicated in the body of the report, the results for three people were inconclusive. The FFM therefore decided to exclude these results as being positive indicators to exposure. Furthermore, due to the extent of other evidence, the team decided that the inconclusive nature of these results did not warrant further investigation with respect to reporting on whether or not chemicals were used as weapons.

6.11 From these four people of the seven mentioned in the previous paragraph, whose biomedical specimens had tested positive for sarin or a sarin-like substance, the team identified one person as having the same name as a casualty from whom the team had previously taken blood that had also tested positive. The DNA of these two samples matched, thus when the analyses of the blood samples from the other three positive samples are viewed in the context of the matching DNA, medical records, and witness testimony, the team attached credibility to the results obtained from the other three people. As such, the FFM confirms with a high level of confidence that these three additional people were exposed to sarin or a sarin-like substance.

6.12 The FFM neither intended nor attempted to interview and take biomedical specimens from every casualty. Instead, the team obtained medical records from different sources and interviewed casualties, first responders, doctors, nurses, and other witnesses. This corroborated evidence demonstrates that a large number of people were exposed to an acetylcholinesterase inhibitor.

6.13 In reviewing the records relating to those who died and those who were survivors, the FFM was unable to determine exact numbers of fatalities and survivors. The FFM attributed the lack of overarching detailed records to the ongoing conflict, the unavailability of hospitals, strained resources, the large number of internally displaced people, the broad range of supporting organisations (such as NGOs), and the prioritisation of promoting recovery amongst survivors. Based on records and testimony, the FFM identified approximately 100 fatalities and at least 200 other casualties who had survived acute exposure.

6.14 Once it became apparent that medical facilities were dealing with a chemical incident, particularly one related to an acetylcholinesterase inhibitor, casualties were decontaminated, as far as was practical, prior to admission to medical facilities. However, due to the delay in recognising this need in conjunction with the varied ways in which casualties were transported to hospitals and the general confusion on the day of the alleged incident, it would be expected that medical staff would become casualties themselves, due to secondary contamination. This secondary contamination was confirmed by some of the interviewees who were not present at the site but displayed symptoms of exposure.

6.15 In summary, the sudden high number of fatalities, the high number of people presenting the same symptoms at the same moment, and the location and the absence of traumatic injuries among the casualties all support the hypothesis of an incident involving a toxic chemical dispersed in the environment.

6.16 As indicated earlier, the FFM did not retrieve its own samples from a controlled and secured site. However, the analytical results from the samples received from all sources are consistent, particularly once the variables around sampling are taken into account.

6.17 The analyses of the samples indicate not only the presence of sarin, but also other chemicals including potential impurities and breakdown products related to sarin, depending on the production route and the raw materials used.

6.18 By reviewing, in conjunction, the evidence relating to autopsy records, biomedical specimens, hospital records, witness testimony, photographs and video supplied during interviews, and environmental samples, the FFM concludes that a significant number of people were exposed to sarin, of which a proportion died from that exposure.

6.19 Although, some witnesses advised that the release was due to a munition dropped from an aircraft, the FFM was unable to retrieve any items from the site which would indicate the means of dispersal of a chemical. After analysing photographs and video supplied by witnesses, the FFM could not establish with a great degree of confidence the means of deployment and dispersal of the chemical.

6.20 Witness testimony related to the site and ensuing events coupled to the analysis of environmental samples from the crater lends credibility to the hypothesis that the sarin release was initiated in the area of the impact point (as indicated in Figure 5).

6.21 The descending nature of the terrain from the initiation point and the distribution of the casualties support the promulgation of a chemical denser than air, which followed the slightly descending nature of the hill towards lower areas towards the West and South West of the likely initiation location, and along a street descending from the hill in a southerly direction.

6.22 When taken together, the number of casualties, the number of fatalities, the topography, the identified chemical, the likely point of initiation and the likely weather conditions all point to the deliberate release of a toxic chemical in sufficient quantity to cause death, incapacitation, and harm to humans and animals.

6.23 The FFM emphasises that it has interviewed a greater number of witnesses than would typically be expected for this type of mission. This relatively larger number has enhanced the corroborative value of different testimonies and provided a means to cross-check the evidence provided. This has therefore imparted greater confidence in the narrative and any resultant conclusions.

6.24 This investigation demonstrated:

(a) an unusual prior event;

(b) a number of afflicted persons with a similar disease or syndrome presenting at around the same time;

(c) a number of cases of unexplained disease;

(d) an illness occurring in an unusual setting within a community;

(e) analyses of signs and symptoms; and

(f) positive laboratory results.

6.25 Whilst the conditions for a safe visit to Khan Shaykhun were not met, the FFM concludes that a large number of people, some of whom died, were exposed to sarin, and that the release that caused the exposure was likely initiated from a release in the vicinity of a crater in the road, located close to the silos in the northern part of the town. It is the conclusion of the team that such a release can only be determined as the use of the Schedule 1A(1) chemical sarin, as a chemical weapon.

Annexes (English only):

Annex 1: Reference Documentation

Annex 2: Open Sources

Annex 3: Timelines

Annex 4: Evidence Obtained by the FFM

Annex 5: Characteristics of Nerve Agents and Sarin

Annex 1

REFERENCE DOCUMENTATION

	Document Reference	Full title of Document
1.	QDOC/INS/SOP/IAU01 (Issue 1, Revision 1)	Standard Operating Procedure for Evidence Collection, Documentation, Chain-of-Custody and Preservation during an Investigation of Alleged Use of Chemical Weapons
2.	QDOC/INS/WI/IAU05 (Issue 1, Revision 2)	Work Instruction for Conducting Interviews during an Investigation of Alleged Use
3.	QDOC/INS/SOP/IAU02 (Issue 1, Revision 0)	Standard Operating Procedure Investigation of Alleged Use (IAU) Operations
4.	QDOC/INS/SOP/GG011 (Issue 1, Revision 0)	Standard Operating Procedure for Managing Inspection Laptops and other Confidentiality Support Materials
5.	QDOC/LAB/SOP/OSA2 (Issue 1, Revision 2)	Standard Operating Procedure for Off-Site Analysis of Authentic Samples
6.	QDOC/LAB/WI/CS01 (Issue 1, Revision 2)	Work Instruction for Handling of Authentic Samples from Inspection Sites and Packing Off-Site Samples at the OPCW Laboratory
7.	QDOC/LAB/WI/OSA3 (Issue 2, Revision 1)	Work Instruction for Chain of Custody and Documentation for OPCW Samples On-Site
8.	QDOC/LAB/WI/OSA4 (Issue 1, Revision 3)[2]	Work Instruction for Packing of Off-Site Samples
9.	S/1402/2016	Status of the Laboratories Designated for the Analysis of Authentic Biomedical Samples
10.	C-20/DEC.5	Designation of Laboratories for the Analysis of Authentic Biomedical Samples and Guidelines for the Conduct of Biomedical Proficiency Tests

[2] Latest version: 13 February 2017

Annex 2

OPEN SOURCES

Open source internet links related to the Khan Shaykhun incident
http://aa.com.tr/en/middle-east/turkey-sends-ambulances-to-syrias-idlib/788696
http://thefreethoughtproject.com/chemical-weapons-attack-syria-white-helmets/
http://timesofindia.indiatimes.com/india/breaking-news/livenews/54474561.cms
http://www.bbc.com/news/world-middle-east-39488539
http://www.bbc.com/news/world-middle-east-39500319
http://www.cbsnews.com/news/syria-chemical-weapon-attack-autopsies-turkey-says-trump-blames-assad-russia/
http://www.middleeasteye.net/news/gas-attack-kills-18-syrias-idlib-observatory-1708105490
http://www.syriahr.com/en/?p=64063
http://www.telegraph.co.uk/news/2017/04/04/syria-gas-attack-nine-children-among-least-35-people-reported/?WT.mc_id=tmg_share_tw
http://www.yenisafak.com/en/dunya/turkey-sends-ambulances-to-syrias-idlib-2638443
https://en.wikipedia.org/wiki/2017_Khan_Shaykhun_chemical_attack
https://m.facebook.com/story.php?story_fbid=1889428304604063&id=1717062255174003
https://m.kiblat.net/2017/04/05/ini-identitas-pilot-pembantai-warga-khan-shaikhoun-di-idlib/
https://twitter.com/AbdulrhmanMasri/status/849147537495908352
https://twitter.com/Acemal71/status/849250471827124224
https://twitter.com/Conflicts/status/849146624253329408
https://twitter.com/Conflicts/status/849147396101738496
https://twitter.com/Conflicts/status/849153755543195649
https://twitter.com/Conflicts/status/849158537649565696
https://twitter.com/DailySabah/status/849244431802871808
https://twitter.com/DrShajulIslam
https://twitter.com/DrShajulIslam/status/849184962419064832
https://twitter.com/EuroMedHR/status/849192810284756993
https://twitter.com/JakeGodin/status/849259284412203008
https://twitter.com/kshaheen/status/850065642791284737
https://twitter.com/markito0171/status/850052568097189889
https://twitter.com/NorthernStork/status/849142790772621312
https://twitter.com/shawncarrie/status/849253115564093440
https://twitter.com/ShehabAgency/status/849187871940653056
https://twitter.com/sterion75/status/849258695980613632
https://twitter.com/Elizrael/status/849204305072709632
https://www.enabbaladi.net/archives/140756
https://www.enca.com/world/hollande-accuses-assad-of-chemical-weapons-massacre

Open source internet links related to the Khan Shaykhun incident
• https://www.facebook.com/edlibEmc12/videos/1889428304604063/?autoplay_reason=all_page_organic_allowed&video_container_type=4&video_creator_product_type=0&app_id=350685531728&live_video_guests=0 • https://www.facebook.com/permalink.php?story_fbid=1670550746579431&id=1489609321340242 • https://www.qasioun.net/ar/news/show/59687/%D8%B9%D8%B4%D8%B1%D8%A7%D8%AA_%D8%A7%D9%84%D9%82%D8%AA%D9%84%D9%89_%D9%88%D8%A7%D9%84%D9%85%D8%B5%D8%A7%D8%A8%D9%8A%D9%86_%D8%A5%D8%AB%D8%B1_%D8%BA%D8%A7%D8%B1%D8%A7%D8%AA_%D8%A8%D8%BA%D8%A7%D8%B2_%D8%B3%D8%A7%D9%85_%D8%A7%D8%B3%D8%AA%D9%87%D8%AF%D9%81%D8%AA_%D8%AE%D8%A7%D9%86_%D8%B4%D9%8A%D8%AE%D9%88%D9%86_%D8%A8%D8%B1%D9%8A%D9%81_%D8%A5%D8%AF%D9%84%D8%A8_%D8%B5%D9%88%D8%B1 • https://www.theguardian.com/world/2017/apr/04/syria-chemical-attack-idlib-province • https://www.youtube.com/watch?v=LbI1ATu-8UY • https://www.youtube.com/watch?v=LZ3uJNMva5k • https://www.youtube.com/watch?v=QexHNA1bZD8 • https://www.youtube.com/watch?v=rSooD8Owshc • https://www.youtube.com/watch?v=sinGDpQ27_I

Annex 3

TIMELINES

TABLE 1: MISSION RELATED TIMELINES

Date	Time (CET)	Activities
Tuesday 4 April	0900	Fact Finding Mission (FFM) alerted to an alleged use of chemicals as weapons in the Khan Shaykhun area of Idlib Governorate. Open sources suggest the attack happened at 0530 CET.
	1200	FFM inform Office of the Director General (ODG) that a team is ready to deploy.
Wednesday 5 April	0800	An advance two-person team departs HQ. Whilst in transit, the team was diverted to enable their attendance at three autopsies.
	2300	Advance team attends autopsies on three of the deceased and continued to the Field Operating Base (FOB) the following morning. Biomedical samples collected from all three deceased people.
Thursday 6 April	0730	A follow-up team of four people depart HQ and rendezvous with the advance team at the FOB.
Saturday 8 April	0730	Six-person team deploy in two vehicles, to three hospitals located elsewhere in the neighbouring country.
	0900 - 1830	First interviews performed. Biomedical samples taken from 10 patients.
	1100	Sample team transport biomedical samples from autopsies back to OPCW Laboratory.
Wednesday 12 April	0730	Receipt of biomedical and biological-environmental samples.
	1100	Sample team transport biomedical samples from hospital patients back to OPCW Laboratory.
Thursday 13 April	1100	Departure of sample transportation team. Receipt of environmental and biological-environmental samples.
Friday 14 April – Friday 12 May	NA	Interviews. Note: several interviews were also carried out in relation to other allegations. Analysis and review of interviews.
Friday 14 April	NA	Receipt of biomedical samples.
Friday 14 April – Thursday 20 April	NA	Preparation and packaging of samples for transport.

Date	Time (CET)	Activities
Friday 21 April	1530	Return of samples plus return of one sub-team to HQ
Monday 10 April – Tuesday 25 April		Samples shipped to DL's
Friday 12 May		Autopsy reports received by the Secretariat.
Wednesday 5 April – Friday 19 May		Reception of preliminary and final analytical results as per table below
Wednesday 31 May – Thursday 1 June	NA	Three additional interviews.
Friday 9 June	1030	Receipt of translated autopsy records.
Thursday 8 – Saturday 10 June		Visit to Damascus and receipt of information from SAR
Saturday 1 – Thursday 22 June		FFM in Damascus.
Sunday 18 June		Meeting with SAR authorities, review of videos, receipt of documents, receipt of 20 samples from SSRC and report of the laboratory analysis
Monday 19 June		Departure of sample transportation team.
Tuesday 20 June		Receipt of samples at OPCW laboratory.
Wednesday 21 June		OPCW Laboratory results received by FFM.
Wednesday 21 June – Thursday 22 June		Two further interviews

TABLE 2: SAMPLING AND ANALYSIS RELATED TIMELINES

	Source of sample	Received by FFM	Received at OPCW Lab	Shipped to DLs	Preliminary results received by OPCW Lab		Final Results Received by OPCW Lab	
					DL 1	DL 2	DL 1	DL 2
1.	Blood & tissue from 3 autopsies	5 April	8 April	10 April	12 April	12 April	11 May	1 May
2.	Blood from 10 patients, urine from 5 patients	8 April	12 April	14 April	16 April	18 April	25 April	28 April
3.	Bio-environmental samples	12 April 13 April	21 April	25 April	3 May	3 May	19 May	11 May
4.	Environmental samples	13 April	21 April	25 April	3 May	3 May	9 May	17 May
5.	Biomedical samples, supplied from Syrian medical facilities in Idlib	12 April 14 April	21 April	18 May	N/A	N/A	31 May	31 May
6.					30 May	31 May	2 June	2 June
7.	Additional biomedical sample	1 May	10 May	N/A	N/A	N/A	17 May	29 May
8.	Samples supplied by SAR SSRC	18 June	20 June	N/A	N/A	N/A	N/A	N/A

Note: samples received from the Government of the Syrian Arab Republic have not yet been analysed by DLs

Annex 4

EVIDENCE OBTAINED BY THE FFM

The Table 1 below summarises the list of physical evidence collected from various sources by the FFM. It is split into electronic evidence stored in electronic media storage devices such as USB sticks and micro SD cards, hard copy evidence and samples. Electronic files include audio-visual captions and still images. Hardcopy files consist of various documents including autopsies, medical records, death certificates and other patients' information. The table also shows the list of samples collected from various sources including, biological samples comprising blood, urine, hair and secretion from patients, selected anatomical parts of a bird, hair from a goat, environmental samples including rock and soil, and several clothing materials.

The subsequent Table 2 lists all the electronic files which are saved on the various storage devices.

TABLE 1: PHYSICAL EVIDENCE COLLECTED BY THE TEAM

Entry Number	Evidence description	Evidence reference number	Evidence source
	Electronic and hard copy files and documents		
1.	Kingston 8GB USB Stick - Folders and files	20170414131837	Handed over by 1318
2.	Report of the event – 5 pages	20170414135903	Handed over by 1359
3.	Kingston 8GB USB Stick - Folders and files	20170410136103	Handed over by 1361
4.	Transcend 4 GB µSD Card - Folders and files	20170508137403	Handed over by 1374
5.	Transcend 4 GB µSD Card - Folders and files	20170510137503	Handed over by 1375
6.	Kingston 16GB SD Card - Folders and files	20170510137703	Handed over by 1377
7.	Mandate/authorisation – 2 pages	20170510137703	Handed over by 1377
8.	Patients' transfer documents – 5 pages	20170510137703	Handed over by 1377
9.	Death certificates – 49 pages	20170510137703	Handed over by 1377
10.	Medical records – 238 pages	20170510137703	Handed over by 1377
11.	Transcend 16GB SD Card - Folders and files	20170430138403	Handed over by 1384
12.	Kingston 16GB SD Card - Folders and files	20170510150403	Handed over by 1504
13.	Medical records – 52 pages	20170510150403	Handed over by 1504

Entry Number	Evidence description	Evidence reference number	Evidence source
14.	Kingston 32GB µSD Card - Folders and files	20170510151903	Handed over by 1519
15.	Syrox 16GB USB Stick - Folders and files	20170510151903	Handed over by 1519
16.	Medical and sampling records – 14 pages	201704121351A0	Idlib Health Directorate
17.	SanDisk 8GB USB Stick - Folders and files	201704121351A0	Idlib Health Directorate
18.	Autopsy records (91 pages, including cover letter) and photographs (198)	20170512103901	A State Party
19.	Google maps print outs – 5 pages	201706211000903	Handed over by 10009
20.	Drawing of affected area and google map printout – 2 page	201706221002203	Handed over by 10022
21.	Report titled "Preliminary information regarding an incident in Khan Shaykhun on 04 April 2017"	FFM/029/17/6799/013	SAR National Authority (NA)
22.	Report titled "Medical remarks on the cases of injury in the Khan Shaykhun incident of 04 April 2017"	FFM/029/17/6799/014	SAR NA
23.	CD containing videos titled "Study of the injuries of the Khan Shaykhun incident of 04 April 2017"	FFM/029/17/6799/015	SAR NA
24.	Report of the laboratory analysis conducted in SSRC Barzah	FFM/029/17/6898/029	SAR NA
25.	GC-MC chromatograms, spectrums of compounds of the samples	FFM/029/17/6898/030	SAR NA
26.	Lists of samples collected in Khan Shaykhun	FFM/029/17/6898/031	SAR NA
27.	Headlines of the testimonies from 3 witnesses	FFM/029/17/6898/037	SAR NA
28.	1 CD-ROM, containing videos of the sampling process in Khan Shaykhun	FFM/029/17/6898/038	SAR NA
29.	1 CD-ROM, containing videos of "improvised" interviews	FFM/029/17/6898/039	SAR NA

Entry Number	Evidence description	Evidence reference number	Evidence source
	Samples		
1.	Bird: feathers and wings	20170412135121	Syrian Civil Defence
2.	Bird: brain	20170412135122	Syrian Civil Defence
3.	Bird: stomach	20170412135123	Syrian Civil Defence
4.	Bird: heart	20170412135124	Syrian Civil Defence
5.	Blood	201704121351A1	Idlib Health Directorate
6.	Blood	201704121351A2	Idlib Health Directorate
7.	Urine	201704121351A3	Idlib Health Directorate
8.	Hair	201704121351A4	Idlib Health Directorate
9.	Blood	201704121351B1	Idlib Health Directorate
10.	Blood	201704121351B2	Idlib Health Directorate
11.	Blood	201704121351C1	Idlib Health Directorate
12.	Blood	201704121351C2	Idlib Health Directorate
13.	Urine	201704121351C3	Idlib Health Directorate
14.	Blood	201704121351D1	Idlib Health Directorate
15.	Blood	201704121351D2	Idlib Health Directorate
16.	Urine	201704121351D3	Idlib Health Directorate
17.	Blood	201704121351E1	Idlib Health Directorate
18.	Blood	201704121351E2	Idlib Health Directorate
19.	Blood	201704121351F1	Idlib Health Directorate
20.	Blood	201704121351F2	Idlib Health Directorate
21.	Urine	201704121351F3	Idlib Health Directorate
22.	Blood	201704121351G1	Idlib Health Directorate
23.	Blood	201704121351G2	Idlib Health Directorate
24.	Urine	201704121351G3	Idlib Health Directorate
25.	Hair	201704121351G4	Idlib Health Directorate

Entry Number	Evidence description	Evidence reference number	Evidence source
26.	Vegetation 10m from location	20170413135101	Syria Civil Defence
27.	Goat hair, 20-30m away. Deceased	20170413135102	Syria Civil Defence
28.	Soil from crater	20170413135103	Syria Civil Defence
29.	Rock from location	20170413135104	Syria Civil Defence
30.	Soil 100m away	20170413135105	Syria Civil Defence
31.	Soil 50m away	20170413135106	Syria Civil Defence
32.	Bird: wings	20170413135107	Syria Civil Defence
33.	Bird: feathers	20170413135108	Syria Civil Defence
34.	Bird: liver	20170413135109	Syria Civil Defence
35.	Bird: heart	20170413135110	Syria Civil Defence
36.	Bird: pectoral muscles	20170413135111	Syria Civil Defence
37.	Hair	20170414131803	Handed over by 1318
38.	Secretion	20170414131805	Handed over by 1318
39.	Blood	20170414131806	Handed over by 1318
40.	Hair	20170414131807	Handed over by 1318
41.	Secretion	20170414131808	Handed over by 1318
42.	Blood	20170414131809	Handed over by 1318
43.	Secretion	20170414131809	Handed over by 1318
44.	Hair	20170414131810	Handed over by 1318
45.	Blood	20170414131812	Handed over by 1318
46.	Hair	20170414131814	Handed over by 1318
47.	Secretion	20170414131815	Handed over by 1318
48.	Urine	20170414131816	Handed over by 1318
49.	Blood	20170414131817	Handed over by 1318
50.	Blood	20170414131818	Handed over by 1318
51.	Urine	20170414131819	Handed over by 1318

Entry Number	Evidence description	Evidence reference number	Evidence source
52.	Secretion	20170414131820	Handed over by 1318
53.	Hair	20170414131821	Handed over by 1318
54.	Blood	20170414131823	Handed over by 1318
55.	Blood	20170414131824	Handed over by 1318
56.	Hair	20170414131826	Handed over by 1318
57.	Secretion	20170414131827	Handed over by 1318
58.	Blood	20170414131828	Handed over by 1318
59.	Blood	20170414131829	Handed over by 1318
60.	Urine	20170414131830	Handed over by 1318
61.	Secretion	20170414131831	Handed over by 1318
62.	Hair	20170414131832	Handed over by 1318
63.	Blood	20170414131833	Handed over by 1318
64.	Clothes	20170414131834	Handed over by 1318
65.	Clothes	20170414131835	Handed over by 1318
66.	Clothes	20170414131836	Handed over by 1318
67.	Clothes	20170414131837	Handed over by 1318
68.	Clothes	20170414131838	Handed over by 1318
69.	01BLS (DMC extract of 01SDS made by SAR)	FFM/029/6898/023/001	SAR
70.	02BLS (DMC extract of 02SDS made by SAR	FFM/029/6898/023/002	SAR
71.	03BLS (DMC extract of 03SDS made by SAR	FFM/029/6898/023/003	SAR
72.	01BLB (DCM blank)	FFM/029/6898/023/004	SAR
73.	01SLS (Soil sample from crater)	FFM/029/6898/023/005	SAR
74.	02SLS (Soil sample from crater adjacent to sample 01SDS)	FFM/029/6898/023/006	SAR
75.	01SDS (Two metal object from crater)	FFM/029/6898/023/007	SAR
76.	03SLS (Soil sample taken 80 m away from crater)	FFM/029/6898/023/008	SAR
77.	02SDS (Bone of animal taken from silos)	FFM/029/6898/023/009	SAR

Entry Number	Evidence description	Evidence reference number	Evidence source
78.	11SLS (Soil sample taken from a house)	FFM/029/6898/023/018	SAR
79.	08SLS (Soil from house)	FFM/029/6898/023/014	SAR
80.	09SLS (Soil sample taken from different Mosque)	FFM/029/6898/023/015	SAR
81.	07SLS (Soil sample 50 m south of the silos)	FFM/029/6898/023/013	SAR
82.	12SLS (Soil sample from different locations)	FFM/029/6898/023/019	SAR
83.	04SLS (Soil sample 75 m north from the crater)	FFM/029/6898/023/010	SAR
84.	05SLS (Soil sample taken near Khaled Ibn Al Walid Mosque)	FFM/029/6898/023/011	SAR
85.	06SLS (Soil sample taken near a house)	FFM/029/6898/023/012	SAR
86.	04SDS (Soil sample - stones- from different locations)	FFM/029/6898/023/020	SAR
87.	10SLS (Soil sample taken from a house)	FFM/029/6898/023/016	SAR
88.	03SDS (three leaves from different location)	FFM/029/6898/023/017	SAR

TABLE 2: ELECTRONIC EVIDENCE COLLECTED BY THE TEAM

Interview Number	Folder Location	File Names	
1318	D:\1318\1318 Evidence	1	DSC_0119
		2	DSC_0120
		17671143_120332000155904974_508139108_nثث	DSC_0121
		17690904_120332000111908313_1132266858_nثث	DSC_0122
		17690994_120332000111571701_1339978970_n888	DSC_0123
		17741020_1904824299762620_875447645_nثث	DSC_0124
		17757478_741319562710464_5362090686220065959_n66	DSC_0125
		17757828_1904824489762601_557267391_n333	DSC_0129
		17760385_120332000128014582_1565646408_n77	DSC_0130
		17760730_120332000117519043_236479749_n77	سس
		17793026_120332000143197102_136519629_nنن	MOV_0115
		17793062_120332000110040457_1772714592_nن	MOV_0126
		17793159_1904824333095950_219894349_nسسس	MOV_0127
		17793474_1904824309762619_144043703_nنني	MOV_0128
		17796712_984705734999075_7019201702733650026_n555555	MOV_0173
		17806828_120332000107557486_696496462_nحح	MOV_0175
		17806843_1904824456429271_45160440_nلل	VID-20170407-WA0036
		17806919_1904824439762606_33540955_n111	VID-20170408-WA0012
		17806951_120332000096115019_293728909_nححح	VID-20170408-WA0013
		17814023_120332000146446444_1813014030_ncc	اسماء المصابين والشهداء من الكيماوي
		DSC_0113	تقرير كمياوي
		DSC_0114	صور لمجزرة الكيماوي
		DSC_0116	طفلة اية دلال
		DSC_0117	مقاطع فيديو لمجزرة الكيماوي
		DSC_0118	

Interview Number	Folder Location	File Names	
1351	D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو عينات\استلام العينات	استلام وحفظ العينات 5نيسان 2017	نقل العينات الى باب الهوى
		استلام وحفظ العينات 6نيسان 2017	
	D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو B عينات\اسماعيل رسلان	دم A1A2 اسماعيل رسلان	
	D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو E عينات\جثة مجهولة الهوية	E1E2 جثة مجهولة الهوية	E1E2 جثة مجهولة الهوية
	Folder: D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو G عينات\زياد تلاوي	دم وشعر G1G2G4 زياد تلاوي	
	D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو D عينات\شموس عواش	٢٠١٧٠٤٠٥_١٦٣٤٣١	دم D1D2 شموس عواش
	D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو A عينات\عبد المجيد سفر	٢٠١٧٠٤٠٤_١٥٤٢١٥	بول A3 عبد المجيد سفر
		دم A1A2 عبد المجيد سفر	شعر A4 عبد المجيد سفر
	D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو C عينات\ماريا مرعي	دم C1C2 ماريا مرعي	
	D:\1351\1351 Evidence\From Witness\Local Disk\ فيديو F عينات\هيفاء سويدان	٢٠١٧٠٤٠٦_١٢١٥٠٥	دمF1F2F4 هيفاء سويدان
	D:\1351\1351 Evidence\From Witness\Local Disk	Detailed Report on Sampling.pdf	شهادة احد المسعفين
		تقرير تفصيلي عن سحب العينات للكيماوي	
1359	D:\1359\1359 Evidence	TOSHIBA (8GB)	
1361	D:\1361\Evidence1361\KINGSTON	أضابير المرضى (1	

Interview Number	Folder Location	File Names	
	D:\1361\Evidence1361\KINGSTON\مصابين خان شيخون	٢٠١٧٠٤٠٤ ١١٤٥٣٠	٢٠١٧٠٤٠٤ ١٠٣٢٤٥
		٢٠١٧٠٤٠٤ ١١٤٣٤١	٢٠١٧٠٤٠٤ ١٠٣٢٣٧
		٢٠١٧٠٤٠٤ ١١٤٣٣٩	٢٠١٧٠٤٠٤ ١٠٣٢٠٥
		٢٠١٧٠٤٠٤ ١٠٥٤٥٤	٢٠١٧٠٤٠٤ ١٠٣١٥٩
		٢٠١٧٠٤٠٤ ١٠٥٤٤٨	٢٠١٧٠٤٠٤ ١٠١٨٣٤
		٢٠١٧٠٤٠٤ ١٠٥٤٤٩	٢٠١٧٠٤٠٤ ١٠١٨٢٤
		٢٠١٧٠٤٠٤ ١٠٥٣١٩	٢٠١٧٠٤٠٤ ١٠١٨١٧
		٢٠١٧٠٤٠٤ ١٠٤٩٤٤	1) Ìç)
		٢٠١٧٠٤٠٤ ١٠٤٩٣٩	2) Ìç)
		٢٠١٧٠٤٠٤ ١٠٤٨٤٤	3) Ìç)
		٢٠١٧٠٤٠٤ ١٠٣٤٢٤	4) Ìç)
		٢٠١٧٠٤٠٤ ١٠٣٤٠٤	5) Ìç)
		٢٠١٧٠٤٠٤ ١٠٣٣٥٩	00052
		٢٠١٧٠٤٠٤ ١٠٣٣٥٢	٢٠١٧٠٤٠٤ ١٠٥١٣٦
		٢٠١٧٠٤٠٤ ١٠٣٣٥١	اسماء المصابين الذين تم علاجهم في مشفى سرمين
		٢٠١٧٠٤٠٤ ١٠٣٣٤٩	اسماء المصابين
		٢٠١٧٠٤٠٤ ١٠٣٣٤٧	تقرير استقبال حالات الاختناق
		٢٠١٧٠٤٠٤ ١٠٣٢٥١	
1374	D:\1374\1374 Evidence\SD\1374 evidence\1374 evidence original\-ضحايا القصف 20170508T091502Z-001\1374-evidence-01	›âÍAÏ°Ì¿›ê›à	00
		0000000000000000	ÌÌÌÌ°Ì¬Ì°›ã›êÌ¬›ã›ê›êÌ¿Ì°›ãÌ°Ì¬Ì°Ì«Ì¬›ãÌ°›é Ì¿›êÍA›û Ì¿›Ç¨ÌÌ°Ì ÌÌ°›à' Ì¿›ã›ê Ì«Ì°›à Ì¿›èÌ«›ê›à Ì¿ÌÑÌ»›ãÌ¿
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		0000000000	IMG_8131
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		000000	
	D:\1374\1374	MVI_8199	

Interview Number	Folder Location	File Names	
	Evidence\SD\1374 evidence\1374 evidence original\-شهادة 20170508T092329Z-001\1374-evidence-02	MVI_8200	
	D:\1374\1374 Evidence\SD\1374 evidence\1374 evidence original\1 ملف	IMG-20170505-WA0173	Screenshot_٢٠١٧-٠٥-٠٨-٠٨-٣٠-٥٠
		IMG-20170505-WA0174	Screenshot_٢٠١٧-٠٥-٠٨-٠٨-٣٣-١٢
		IMG-20170505-WA0175	Screenshot_٢٠١٧-٠٥-٠٨-٠٨-٣٣-١٧
		IMG-20170505-WA0176	VID-20170506-WA0023
		IMG-20170505-WA0177	VID-20170507-WA0091
		IMG-20170505-WA0178	VID-20170507-WA0092
		IMG-20170505-WA0179	VID-20170507-WA0095
		IMG-20170505-WA0180	VID-20170507-WA0096
		IMG-20170505-WA0181	VID-20170507-WA0097
		IMG-20170505-WA0182	VID-20170507-WA0098
		IMG-20170505-WA0183	VID-20170507-WA0099
		Screenshot_٢٠١٧-٠٥-٠٧-١٩-٣٢-٤٥	VID-20170507-WA0100
		Screenshot_٢٠١٧-٠٥-٠٧-١٩-٣٣-٣٤	VID-20170507-WA0101
		Screenshot_٢٠١٧-٠٥-٠٨-٠٨-٣٠-٢٤	VID-20170507-WA0102
		Screenshot_٢٠١٧-٠٥-٠٨-٠٨-٣٠-٣٠	VID-20170508-WA0008

Interview Number	Folder Location	File Names			
		Screenshot_٢٠١٧-٠٥-٠٨-٠٨-٣٠-٤٠		عشرات القتلى وحالات اختناق بقصف بـ_غاز سام_على خا	
	D:\1374\1374 Evidence\SD\1374 evidence\1374 evidence original	Untitled2 (1)		Untitled2	
		Untitled2 (2)		WhatsApp Image 2017-05-08 at 11.30.45	
		Untitled2 (3)		نيسان - النصف الأول - مشفى مغارة الرحمة	
	D:\1374\1374 Evidence\SD\1374 evidence\1374 evidence working copy	Back up folder: same as all the subfolders and files in 1374 folders above			
1375	D:\1375\1375 Evidence\SD\1375-Evidences\-4-4 كيماوي\2017\الصور	IMG_9128		IMG_9134	
		IMG_9129		IMG_9136	
		IMG_9130		IMG_9137	
		IMG_9131		IMG_9138	
		IMG_9132		IMG_9139	
		IMG_9133			
	D:\1375\1375 Evidence\SD\1375-Evidences\-4-4 كيماوي\2017\فديو	MVI_9124		MVI_9127	
		MVI_9125		MVI_9135	
		MVI_9126			
	D:\1375\1375 Evidence\SD\1375-Evidences working copy\2017-4-4 كيماوي	Back up folder: same as all the subfolders and files in 1375 folders above			
1377	D:\1377\1377 Evidence\SD\1377 – Evidences	MVI_8361		MVI_8374	
		MVI_8366		MVI_8375	
		MVI_8370		MVI_8377	
		MVI_8371		MVI_8385	
		MVI_8373			
1384	D:\1384\1384 Evidence\SD\1384 Evidence\ قصف مركز الدفاع المدني 2017-4-4	IMG_1017	IMG_1027	IMG_1066	IMG_1086
		IMG_1018	IMG_1028	IMG_1067	IMG_1087
		IMG_1019	IMG_1029	IMG_1068	IMG_1088
		IMG_1020	IMG_1030	IMG_1071	IMG_1089
		IMG_1021	IMG_1031	IMG_1072	IMG_1091
		IMG_1022	IMG_1032	IMG_1081	IMG_1092

Interview Number	Folder Location	File Names			
		IMG_1023	IMG_1033	IMG_1082	IMG_1093
		IMG_1024	IMG_1035	IMG_1083	IMG_1094
		IMG_1025	IMG_1036	IMG_1084	IMG_1095
		IMG_1026	IMG_1065	IMG_1085	MVI_1034
	D:\1384\1384 Evidence\SD\1384 Evidence\كيماوي خان شيخون	IMG_0915	IMG_0994	IMG_1161	IMG_8110
		IMG_0916	IMG_0995	IMG_1162	IMG_8111
		IMG_0917	IMG_0996	IMG_1163	IMG_8112
		IMG_0918	IMG_0997	IMG_1164	IMG_8115
		IMG_0919	IMG_0998	IMG_1165	IMG_8116
		IMG_0920	IMG_0999	IMG_1166	IMG_8117
		IMG_0921	IMG_1001	IMG_1167	IMG_8118
		IMG_0922	IMG_1003	IMG_1168	IMG_8123
		IMG_0923	IMG_1005	IMG_1169	IMG_8125
		IMG_0924	IMG_1006	IMG_1170	IMG_8126
		IMG_0925	IMG_1007	IMG_1171	IMG_8127
		IMG_0926	IMG_1010	IMG_1172	IMG_8129
		IMG_0927	IMG_1011	IMG_1173	IMG_8130
		IMG_0928	IMG_1012	IMG_1174	IMG_8131
		IMG_0929	IMG_1042	IMG_1175	IMG_8133
		IMG_0930	IMG_1043	IMG_1176	IMG_8134
		IMG_0931	IMG_1044	IMG_1177	IMG_8135
		IMG_0932	IMG_1045	IMG_1178	IMG_8136
		IMG_0933	IMG_1062	IMG_1179	IMG_8137
		IMG_0934	IMG_1063	IMG_1180	IMG_8138
		IMG_0935	IMG_1090	IMG_1181	IMG_8139
		IMG_0936	IMG_1100	IMG_1182	IMG_8140
		IMG_0937	IMG_1101	IMG_1183	IMG_8142
		IMG_0938	IMG_1102	IMG_1184	IMG_8146
		IMG_0939	IMG_1103	IMG_1185	IMG_8148
		IMG_0940	IMG_1104	IMG_1186	MVI_0950
		IMG_0941	IMG_1105	IMG_1187	MVI_0951
		IMG_0942	IMG_1106	IMG_1188	MVI_0956
		IMG_0943	IMG_1107	IMG_1189	MVI_0957
		IMG_0944	IMG_1108	IMG_1190	MVI_0982
		IMG_0945	IMG_1109	IMG_1191	MVI_1040
		IMG_0946	IMG_1110	IMG_1192	MVI_1041
		IMG_0947	IMG_1122 - Copy	IMG_1193	MVI_1046

Interview Number	Folder Location	File Names			
		IMG_0948	IMG_1122	IMG_1199	MVI_1047
		IMG_0949	IMG_1123	IMG_1200	MVI_1048
		IMG_0952	IMG_1124	IMG_1201	MVI_1049
		IMG_0953	IMG_1125	IMG_1202	MVI_1050
		IMG_0954	IMG_1126	IMG_1203	MVI_1053
		IMG_0955	IMG_1127	IMG_1204	MVI_1054
		IMG_0961	IMG_1128	IMG_1205	MVI_1055
		IMG_0962	IMG_1129	IMG_1206	MVI_1056
		IMG_0963	IMG_1130	IMG_1207	MVI_1057
		IMG_0964	IMG_1131	IMG_1208	MVI_1058
		IMG_0965	IMG_1132	IMG_1209	MVI_1059
		IMG_0966	IMG_1133	IMG_1210	MVI_1112
		IMG_0967	IMG_1134	IMG_1211	MVI_1113
		IMG_0968	IMG_1135	IMG_1212	MVI_1114
		IMG_0969	IMG_1138	IMG_1213	MVI_1116
		IMG_0970	IMG_1139	IMG_1214	MVI_1118
		IMG_0971	IMG_1140	IMG_1215	MVI_1119
		IMG_0972	IMG_1141	IMG_1216	MVI_1120
		IMG_0973	IMG_1142	IMG_1217	MVI_1121
		IMG_0974	IMG_1143	IMG_1218	MVI_1196
		IMG_0975	IMG_1144	IMG_1219	MVI_8113
		IMG_0976	IMG_1145	IMG_1220	MVI_8114
		IMG_0977	IMG_1146	IMG_1221	MVI_8119
		IMG_0978	IMG_1147	IMG_1222	MVI_8120
		IMG_0979	IMG_1148	IMG_1223	MVI_8121
		IMG_0980	IMG_1149	IMG_1224	MVI_8122
		IMG_0981	IMG_1150	IMG_1225	MVI_8124
		IMG_0983	IMG_1151	IMG_1226	MVI_8128
		IMG_0984	IMG_1152	IMG_1227	MVI_8132
		IMG_0985	IMG_1153	IMG_1228	MVI_8141
		IMG_0986	IMG_1154	IMG_1229	MVI_8143
		IMG_0987	IMG_1155	IMG_1230	MVI_8144
		IMG_0988	IMG_1156	IMG_1231	MVI_8145
		IMG_0990	IMG_1157	IMG_1232	MVI_8147
		IMG_0991	IMG_1158	IMG_1233	
		IMG_0992	IMG_1159	IMG_1234	
		IMG_0993	IMG_1160	IMG_8109	

Interview Number	Folder Location	File Names			
	D:\1384\1384 Evidence\SD\1384 Evidence\كيماوي	IMAG0390		IMAG0396	
		IMAG0392		IMAG0397	
	D:\1384\1384 Evidence\SD\1384 Evidence	كيماوي خان شيخون			
1504	D:\1504\1504 Evidence\SD\1504-Evidences\المشفى	٢٠١٧٠٤٠٤ ١٢١٨٤٤			
		٢٠١٧٠٤٠٤ ١٢١٨٥٤		٢٠١٧٠٤٠٤ ١٢٢٣٣٤	
		٢٠١٧٠٤٠٤ ١٢١٩٣٦		٢٠١٧٠٤٠٤ ١٢٢٣٤١	
		٢٠١٧٠٤٠٤ ١٢٢٠٣٢		٢٠١٧٠٤٠٤ ١٢٢٤٤٩	
		٢٠١٧٠٤٠٤ ١٢٢١٥٥		٢٠١٧٠٤٠٤ ١٢٢٥٠٨	
		٢٠١٧٠٤٠٤ ١٢٢٣١٦		٢٠١٧٠٤٠٤ ١٢٢٥١٣	
		٢٠١٧٠٤٠٤ ١٢٢٣٢٣		٢٠١٧٠٤٠٤ ١٢٢٦٥٧_1	
	D:\1504\1504 Evidence\SD\1504-Evidences	مصابين الكلور بخان شيخون 2017-4-4			
	D:\1504\1504 Evidence\SD\1504 - Evidences working copy	Back up folder: same as all the subfolders and files in 1504 folders above			
1519	D:\1519\1519 Evidence\SD\1519-Evidences\From Google drive	MAH03290 (1)		MVI 8311	
		MAH03290		MVI 8313	
		MAH03291 (1)		MVI 8314	
		MAH03291			
	D:\1519\1519 Evidence\SD\1519-Evidences\From USB	00122	00138	00154	00176
		00123	00139	00155	00177
		00124	00140	00156	00178
		00125	00141	00157	00180
		00126	00142	00158	00181
		00127	00143	00159	00182
		00128	00144	00160	00183
		00129	00145	00163	00185
		00130	00146	00164	00186
		00131	00147	00165	00187
		00132	00148	00166	00188
		00133	00149	00167	00189
		00134	00150	00169	00191
		00135	00151	00170	روابط

Interview Number	Folder Location	File Names			
		00136	00152	00174	
		00137	00153	00175	
	D:\1519\1519 Evidence\SD\1519-Evidences working copy	Back up folder: same as all the subfolders and files in 1519 folders above			
N/A	D:\SAR\Evidence\CD\Study of the injuries of the Khan Shaykhun incident of 04 April 2017	Study on the casualties resulting from the incident of Khan Shaykhun on 4 April 2017.pdf Chemical casualties in Khan Shaykhun and the Civil Defence provides services and transports them to the medical points.mp4 Over 30 suffocation cases as a result of an attack against the city-Edlib Media Centre.mp4 Important: chlorine casualties in Khan Shaykhun in Rif Idlib-YouTube.mp4 Civil Defence Idlib Khan Shaykhun 4-4-2017 civilian victims following a toxic substance raid.mp4 YouTube- Syrian Civil defence Idlib 4-4-2017 (a victim of the Khan Shaykhun toxic attack).mp4 Tens of deaths and cases of suffocation as a result of a toxic gas against Khan Shaykhun – Idlib.mp4 1.mp4 Aleppo today camera tour in Bab al Hawa border crossing following the arrival of casualties affected by chemical weapons in Khan Shaykhun.mp4 Rif Idlib – Statements from Medical Personnel on the attack against Khan Shaykhun with sarin 4-4-2017.mp4			
N/A	D:\SAR\Evidence\CD\Sampling process in Khan Shaykhun	KH1/KH.mp4, KH2-1/VID-20170419-WA0014.mp4, KH2-4/VID-20170419-WA0030.mp4, KH2-6/VID-20170419-WA0023.mp4, KH2-7/VID-20170419-WA0039.mp4, KH3/VID-20170419-WA0099.mp4, KH3-1/VID-20170419-WA0031.mp4, KH3-2/VID-20170419-WA0029.mp4, KH3-3/VID-20170419-WA0048.mp4, KH4/VID-20170419-WA0096.mp4, KH5/VID-20170419-WA0098.mp4, KH5-1/VID-20170419-WA0035.mp4,			
N/A	D:\SAR\Evidence\CD\Videos of "improvised" interviews	1/1.vid, VID-20170426-WA0177.mp4			

Interview Number	Folder Location	File Names
10009	ERN:201706211000903 D:\ 1microSD Photos from phone and audio messages	AUD-20170508-WA0026, AUD-20170509-WA0012, AUD-20170509-WA0013, AUD-20170509-WA0014, AUD-20170509-WA0015, AUD-20170509-WA0016 IMG-20170413-WA0004, IMG-20170413-WA0005, IMG-20170413-WA0006, IMG-20170413-WA0007, IMG-20170413-WA0008, IMG-20170413-WA0009, IMG-20170413-WA0010, IMG-20170413-WA0011, IMG-20170413-WA0012, IMG-20170413-WA0013, IMG-20170413-WA0014, IMG-20170413-WA0015, IMG-20170413-WA0016, IMG-20170413-WA0018, IMG-20170413-WA0019, IMG-20170619-WA0007, IMG-20170621-WA0020

Annex 5

CHARACTERISTICS OF NERVE AGENTS AND SARIN

Properties of Nerve Agents

Sarin belongs to a group of organophosphorus chemical warfare agents called nerve agents, which are chemically and structurally related to organophosphorus pesticides. They are absorbed by inhalation, ingestion or through the skin. For volatile nerve agents such as sarin, inhalation is considered to be the primary route of entry.

In their purest form, nerve agents are colourless and odourless liquids, however colouration can vary from pale yellow to dark brown depending on the level of impurities present. Sarin is one of the more volatile nerve agents and evaporates at a similar rate to water. It breaks down fairly quickly in the presence of water (hydrolysis) to give characteristic breakdown products.

Nerve agents are particularly toxic when absorbed by inhalation, but can be absorbed following ingestion, dermal, or eye contact.

Nerve agent vapour is denser than air and therefore has a tendancy to accumulate in low-lying areas.

Effects on Humans

Nerve agents exert their toxic action through the sustained inhibition of the enzyme acetylcholinesterase (AChE). When AChE is inhibited, it is unable to break down the neurotransmitter acetylcholine (ACh). This causes a build-up of neurotransmitter at the nerve synapse which in turn causes excessive stimulation of the nervous system.

Nerve Agent absorbed through lungs or skin casues cramps, muscular contraction, seizures and severe pain, the effects on diaphragm is to lock the lungs in place, causing asphixiation and subsequently death.

Local effects such as miosis (pin point pupils), may occurr in the absence of systemic poisoning.

Dependent on the concentration exposed to and the duration of the exposure, nerve agents can cause the following symptoms:

- Mild symptoms include headache, nausea, miosis, blurred vision, tearing (lachrymation) and painful eyes; runny nose, excess salivation, sweating, muscle weakness and agitation, chest tighness.
- Moderate symptoms include dizziness, disorientation and confusion, sneezing coughing and/or wheezing, marked drooling and excess mucous production, vomiting and diarrhea, marked weakness, difficult in breathing.
- Severe symptoms include severe respiratory distress, pulmonary oedema, convulsions, ventricular arrhythmias, unconsciousness, involuntary urination or defecation.

Medical treatment and antidotes

- Atropine: antagonises the effects of ACh, it is particularly effective in decreasing secretions and treating bradycardia (slow heart beats).

- Oximes: reactivation of inhibited enzymes, thereby decreasing the amount of excess ACh.
- Diazepam: Central Nervous System protector, useful to control agitation and convulsions.